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ABSTRACT

This competency-based module uses the Ocean County (New Jersey) Vocational-Technical Schools curriculum-infused model for infusing basic skills instruction into vocational education. The model demonstrates the relationship of vocational skills to communication, mathematics, and science. The document begins with a philosophy statement; preface; a table that explains the number of hours required for academic credit in various programs and the number of those hours that are devoted to basic skills and vocational activities; matrices that show in which courses specific basic skills are taught; a list of objectives; and an explanation of student activities. Most pages in the document are tables that describe the relationship of vocational skills to basic skills within the commercial construction (masonry) program. These pages are organized by instructional unit and the topics within them. For each topic and associated task(s) are listed the theory and basic skills covered. Also listed are the expected student outcomes. The 11 instructional units included are: orientation; safety; hand tools; equipment use and maintenance; blueprint reading; concrete; block; brick; fireplace construction, carpentry, and estimating. (CML)

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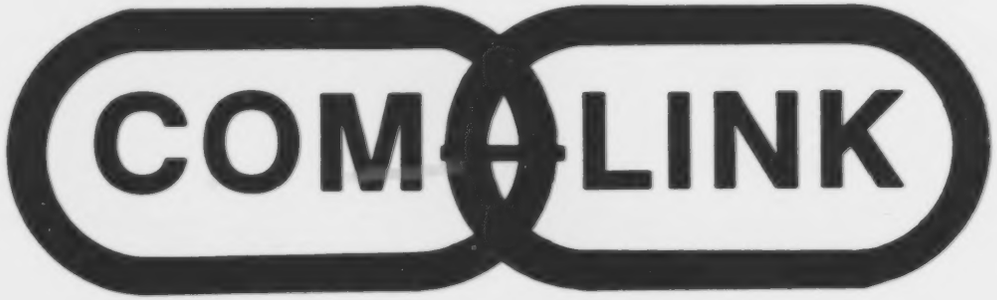
# Competency Based Vocational Curricula




## With Basic Skills And Academic Linkages

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In Cooperation With The

**New Jersey State Department of Education**

**Division of Vocational Education**

**And**

**Ocean County Vocational-Technical School**

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Ocean County Vocational-Technical School

Commercial Building Construction (Masonry)

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## PHILOSOPHY OF EDUCATION

The Ocean County Vocational-Technical Education Program should consist of those courses, activities and experiences which are designed to prepare students for a successful entrance in a given field of work. The program should be based upon an analysis of the worker needs of the field of work, the opportunities and requirements for entrance, and the particular characteristics and needs of the students.

We believe that:

The school should educate and train the students to live effectively in our ever-changing world.

The school should provide, for each student, intensive training toward general and specific job objectives, and setting standards of performance in keeping with the requirements of that particular field of work.

All students should evidence the interest, aptitude, and ability to profit from the specialized instruction, and this should be a condition of entrance into or continuance in a given field of work.

Equal attention should be given in the school program to develop sound character, good citizenship, ability to think critically, and maintain good mental and physical health.

The school must be constantly striving to fulfill its ultimate purpose; that of serving the students and the community. The school should give careful consideration to the needs, interests, and capacities of the students and the educational and technical background, experience, training, and professional interest of the professional staff as they develop a working philosophy of education.

## PREFACE

The curriculum format employed by this project is competency based and utilizes the Ocean County Vocational-Technical Schools' curriculum infused model for the teaching of basic skills as part of vocational education. The design demonstrates the relationship of vocationally related skills to communication, mathematics and science knowledge. Proficiences with regard to student outcomes cannot be achieved without mastery in related academic areas. All student outcome objectives are predicated upon entry level skills which reflect the dictates of the job marketplace and industry. In addition, basic skills matrices developed by the district are included. The totality of this package is designed to facilitate the vocational teaching process and to enchance the learning experiences of our students.

## POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

| COURSE | TOTAL HOURS | HOURS SPENT ON COMMUNICATION SKILLS | HOURS SPENT ON COMPUTATION SKILLS | HOURS SPENT ON SCIENCE | TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP |
|---|---|---|---|---|---|
| AIR CONDITIONING, REFRIGERATION AND HEATING | 900 | 140 | 120 | 120 | 520 |
| AUTO BODY REPAIR | 900 | 130 | 120 | 125 | 525 |
| AUTOMOTIVE MECHANICS | 900 | 150 | 120 | 120 | 510 |
| AUTOMOTIVE AND DIESEL ENGINE REBUILDING | 900 | 216 | 126 | 125 | 433 |
| BEAUTY CULTURE I AND II | 1000 | 240 | 120 | 130 | 515 |
| BUILDING TRADES | 900 | 135 | 120 | 130 | 515 |
| BUSINESS RELATIONS - MEDIA/MODELING | 450 | 200 | 60 | 40 | 150 |
| CHILD CARE AIDE | 900 | 240 | 120 | 122 | 418 |
| COMMERCIAL ART AND PRINTING | 900 | 120 | 215 | 75 | 580 |
| COMMERCIAL BUILDING CONSTRUCTION (MASONRY) | 900 | 130 | 125 | 130 | 515 |

## POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

| COURSE | TOTAL HOURS | HOURS SPENT ON COMMUNICATION SKILLS | HOURS SPENT ON COMPUTATION SKILLS | HOURS SPENT ON SCIENCE | TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP |
|---|---|---|---|---|---|
| COMMERCIAL PHOTOGRAPHY & TELEVISION PRODUCTION | 900 | 150 | 125 | 80 | 545 |
| CUSTOM CABINETMAKING | 900 | 130 | 120 | 60 | 590 |
| DENTAL ASSISTING | 450 | 168 | 65 | 77 | 140 |
| DESIGN DRAFTING | 900 | 135 | 150 | 165 | 450 |
| ELECTRICAL TRADES | 900 | 106 | 120 | 124 | 550 |
| FASHION MERCHANDISING | 450 | 200 | 60 | 40 | 150 |
| FOOD SERVICES | 900 | 206 | 132 | 125 | 437 |
| INDUSTRIAL AUTOMATION AND ELECTRONICS | 900 | 129 | 140 | 132 | 499 |
| INTERIOR DESIGN | 900 | 210 | 130 | 120 | 440 |
| LANDSCAPING AND GREENHOUSE TECHNOLOGY | 900 | 125 | 125 | 175 | 475 |

## POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

| COURSE | TOTAL HOURS | HOURS SPENT ON COMMUNICATION SKILLS | HOURS SPENT ON COMPUTATION SKILLS | HOURS SPENT ON SCIENCE | TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP |
|---|---|---|---|---|---|
| MARINE ENGINE AND BOAT SERVICES | 900 | 164 | 120 | 125 | 491 |
| MEDICAL OFFICE RECEPTIONIST/ASSISTANT | 450 | 173 | 60 | 77 | 140 |
| MEDICAL SKILLS AND RELATED HEALTH CAREERS | 450 | 135 | 65 | 125 | 125 |
| MEDICAL SKILLS (ADVANCED) | 450 | 125 | 60 | 125 | 140 |
| PLUMBING AND HEATING | 900 | 140 | 120 | 120 | 520 |
| RECREATIONAL VEHICLE MAINTENANCE AND REPAIR | 900 | 125 | 130 | 60 | 585 |
| T.V. AND COMPUTER REPAIR | 900 | 125 | 150 | 175 | 450 |
| WELDING | 900 | 135 | 120 | 100 | 545 |

## COMMUNICATION SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School.
The asterisk indicates that the topic is studied in that curriculum.

| COURSE | Functional Reading Skills | Vocabulary | Identifying Main Ideas | Meanings in Context | Inferences | Fact/Opinion Distinction | Signal Words | Parts of Text-book/Manual | Following Directions | Outlining and Note Taking | Interpretation of Maps and Charts | Interpretation of Diagrams | Test Taking Skills | Expository Writing Skills | Problem Solving | Spelling | Oral Communications | Study Skills | Resume Writing | Job Application Skills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIR CONDITIONING, REFRIGERATION AND HEATING | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| AUTO BODY REPAIR | * | * | | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| AUTOMOTIVE MECHANICS | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| AUTOMOTIVE AND DIESEL ENGINE REBUILDING | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| BEAUTY CULTURE I AND II | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| BUILDING TRADES | * | * | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL | * | * | * | * | * | * | * | * | * | * | * | * | * | * | | * | * | * | * | * |
| CHILD CARE AIDE | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| COMMERCIAL ART AND PRINTING CAREERS | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| COMMERCIAL BUILDING CONSTRUCTION (MASONRY) | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| CUSTOM CABINETMAKING | * | * | | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| DENTAL ASSISTING | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |

COMMUNICATION SKILLS - CONTINUED

| COURSE | Functional Reading Skills | Vocabulary | Identifying Main Ideas | Meanings in Context | Inferences | Fact/Opinion Distinction | Signal Words | Parts of Text-book/Manual | Following Directions | Outlining and Note Taking | Interpretation of Maps, Graphs and Charts | Interpretation of Diagrams | Test Taking Skills | Expository Writing Skills | Problem Solving | Spelling | Oral Communications | Study Skills | Resume Writing | Job Application Skills |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DESIGN DRAFTING | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| ELECTRICAL TRADES | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| FASHION MERCHANDISING | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| FOOD SERVICES | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| INDUSTRIAL AUTOMATION AND ELECTRONICS | * | * | * | | * | * | | | * | * | * | * | * | * | * | * | * | * | * | * |
| INTERIOR DESIGN | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| LANDSCAPING AND GREENHOUSE TECHNOLOGY | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| MARINE ENGINE AND BOAT SERVICE | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| MEDICAL OFFICE RECEPTIONIST/ASSISTANT | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| MEDICAL SKILLS AND RELATED HEALTH CAREERS | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| MEDICAL SKILLS (ADVANCED) | * | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | * | * | * |
| PLUMBING AND HEATING | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| RECREATIONAL VEHICLE MAINTENANCE AND REPAIR | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| T.V. AND COMPUTER REPAIR | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| WELDING | * | * | * | | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |

## MATHEMATICS SKILLS

**Listed below are all courses offered at the Ocean County Vocational-Technical School. The asterisk indicates that the topic is studied in that curriculum.**

| COURSE | Whole Numbers | Common Fractions | Decimals | Percentages | Weights and Measurements | Ratio and Proportion | Powers and Roots | Formulas | Estimating | Geometry | Basic Trigonometric Functions | Graphs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIR CONDITIONING, REFRIGERATION AND HEATING | * | * | * | * | * | * | * | * | * | * | * | * |
| AUTO BODY REPAIR | * | * | * | * | * | * | * | * | * | * | | * |
| AUTOMOTIVE MECHANICS | * | * | * | * | * | * | * | * | * | | | * |
| AUTOMOTIVE AND DIESEL ENGINE REBUILDING | * | * | * | * | * | * | * | * | * | * | | * |
| BEAUTY CULTURE I AND II | * | * | * | * | * | * | * | * | * | * | * | * |
| BUILDING TRADES | * | * | * | * | * | * | * | * | * | * | * | * |
| BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL | * | | * | * | | * | | | * | | | * |
| CHILD CARE AIDE | * | * | * | * | * | * | | * | * | * | * | * |
| COMMERCIAL ART AND PRINTING CAREERS | * | * | * | * | * | * | | * | * | * | | * |
| COMMERCIAL BUILDING CONSTRUCTION (MASONRY) | * | * | * | * | * | * | * | * | * | * | * | * |
| COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION | * | * | * | * | * | * | * | * | * | * | * | * |
| CUSTOM CABINETMAKING | * | * | * | * | * | * | * | * | * | * | * | * |
| DENTAL ASSISTING | * | * | * | * | * | * | | * | * | | | * |

MATHEMATICS SKILLS - CONTINUED

| COURSE | Whole Numbers | Common Fractions | Decimals | Percentages | Weights and Measurements | Ratio and Proportion | Powers and Roots | Formulas | Estimating | Geometry | Basic Trigonometric Functions | Graphs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DESIGN DRAFTING | * | * | * | * | * | * | | * | * | * | * | * |
| ELECTRICAL TRADES | * | * | * | * | * | * | * | * | * | * | * | * |
| FASHION MERCHANDISING | * | * | * | * | * | * | | * | * | * | | * |
| FOOD SERVICES | * | * | * | * | * | * | | * | * | * | | * |
| INDUSTRIAL AUTOMATION AND ELECTRONICS | * | * | * | * | * | * | | * | * | * | * | * |
| INTERIOR DESIGN | * | * | * | * | * | * | | * | * | * | | * |
| LANDSCAPING AND GREENHOUSE TECHNOLOGY | * | * | * | * | * | * | | * | * | * | * | * |
| MARINE ENGINE AND BOAT SERVICE | * | * | * | * | * | * | | * | | | * | * |
| MEDICAL OFFICE RECEPTIONIST/ASSISTANT | * | * | * | * | * | * | * | * | * | * | | * |
| MEDICAL SKILLS AND RELATED HEALTH CAREERS | * | * | * | * | * | * | | * | * | * | * | * |
| MEDICAL SKILLS (ADVANCED) | * | * | * | * | * | * | | * | * | * | * | * |
| PLUMBING AND HEATING | * | * | * | * | * | * | * | * | * | * | * | * |
| RECREATIONAL VEHICLE MAINTENANCE AND REPAIR | * | * | * | * | * | * | * | * | | | * | * |
| T.V. AND COMPUTER REPAIR | * | * | * | * | * | * | * | * | | * | * | * |
| WELDING | * | * | * | * | * | * | | * | * | * | * | * |

## SCIENCE SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. Those listed as "Not Available" do not offer enough hours to qualify for credits in your high school. However, we have noted the skills covered. Those listed with an asterisk after the title are eligible. The asterisk indicates that the topic is studied in that curriculum.

| | HUMAN ANATOMY | | | | | | ASTRONOMY | | | CHEMISTRY | | | PHYSICS | | | | | ECOLOGY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COURSE | Cellular Theory | Skeletal System | Muscles | System of Body | Diseases | Psychology | Solar System | Gravity | Weather | Matter | Chemical Reactions | Applied Chemistry | Light | Magnetism | Heat | Magnetism and Electricity | Nuclear Energy | Botany | Food Production | Fuels | Nutrition | Waste Disposal |
| AIR CONDITIONING, REFRIGERATION AND HEATING | | | | | | | * | * | * | * | * | * | | * | * | * | | | | * | * | |
| AUTO BODY REPAIR | | | | | | | | * | * | * | * | * | * | * | * | | | | | * | | * |
| AUTOMOTIVE MECHANICS | | | | | | | | * | | * | * | * | * | * | * | * | | | | * | | |
| AUTOMOTIVE DIESEL AND ENGINE REBUILDING | | | | | | | | * | | * | * | * | | * | * | * | * | | | * | | * |
| BEAUTY CULTURE I AND II | * | * | * | * | * | * | | | | * | * | * | * | | * | * | | | | | * | |
| BUILDING TRADES | | | | | | | * | * | * | * | * | * | * | | * | * | | * | | * | | |
| BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL | N | * O | * T | * A | V | * A | I | L | A | B | L | E | | | | | | | | | | |
| CHILD CARE AIDE | * | * | * | * | * | * | | | * | | * | * | | * | * | | | * | * | | * | * |
| COMMERCIAL ART AND PRINTING CAREERS | N | O | T | A | V | A | I | * L | A | * B | * L | * E | * | | * | * | | | | | | * |
| COMMERCIAL BUILDING CONSTRUCTION (MASONRY) | * | * | * | * | * | * | | * | * | * | * | * | * | * | * | * | | * | | * | * | * |
| COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION | N | O | T | A | V | * A | I | * L | A | * B | * L | * E | * | | * | * | | | | | | * |
| CUSTOM CABINETMAKING | * N | O | T | A | V | A | I | * L | A | * B | * L | * E | | | * | | | * | | | | |
| DENTAL ASSISTING | * | * | * | * | * | * | | | | * | * | * | * | | | | | | | | * | * |

SCIENCE SKILLS - CONTINUED

| COURSE | HUMAN ANATOMY | | | | | | ASTRONOMY | | | CHEMISTRY | | | PHYSICS | | | | | ECOLOGY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cellular Theory | Skeletal System | Muscles | System of Body | Diseases | Psychology | Solar System | Gravity | Weather | Matter | Chemical Reactions | Applied Chemistry | Light | Magnetism | Heat | Magnetism and Electricity | Nuclear Energy | Botany | Food Production | Fuels | Nutrition | Waste Disposal |
| DESIGN DRAFTING | | | | | | | * | * | * | * | | * | * | | * | * | * | | | * | | * |
| ELECTRICAL TRADES | | | | | | | * | * | * | * | * | | * | * | * | * | * | | * | | | |
| FASHION MERCHANDISING | * | * | * | * | | * | | * | | * | * | * | * | | | | | | | | * | |
| FOOD SERVICES | | | | | * | * | | * | * | | * | * | * | | * | | | | * | | * | * |
| INDUSTRIAL AUTOMATION AND ELECTRONICS | | | | | | | | * | | * | | | * | * | * | * | * | | | * | | |
| INTERIOR DESIGN | | * | * | | | * | * | * | * | * | * | * | * | | * | * | | | | | | |
| LANDSCAPING AND GREENHOUSE TECHNOLOGY | | | | | | | * | * | * | | * | * | * | | * | * | | * | * | * | * | * |
| MARINE ENGINE AND BOAT SERVICE | | | | | | | | * | * | * | * | * | * | * | * | * | | * | | * | | |
| MEDICAL OFFICE RECEPTIONIST/ASSISTANT | N | * O | * T | * A | * V | * A | I | L | A | B | * L | E | | | | | | | | | | * |
| MEDICAL SKILLS AND RELATED HEALTH CAREERS | * | * | * | * | * | * | | * | | * | * | | | | | * | | | * | | * | * |
| MEDICAL SKILLS (ADVANCED) | * | * | * | * | * | * | | * | | * | * | | | | | * | | | * | | * | * |
| PLUMBING AND HEATING | | | | | * | | * | * | * | * | * | * | | | * | * | | * | | * | | * |
| RECREATIONAL VEHICLE MAINTENANCE AND REPAIR | N | O | T | A | V | A | I | * L | A | * B | * L | * E | * | * | * | * | | | | * | | * |
| T.V. AND COMPUTER REPAIR | | | | | | | | | | * | * | * | * | * | * | * | | | | * | | |
| WELDING | | | | | | | | * | | * | * | * | * | * | * | * | | | | * | | |

## COURSE OBJECTIVES

1. To prepare students with entry level skills, abilities and knowledge for employment in the commercial building construction (masonry) field.

2. To present 900 hours of instruction and practice in the commercial building construction (masonry) field in accordance with the course curriculum and skill profile outline.

3. To provide a detailed summary evaluation of the proficiency achieved by each student representing the most important content areas presented in the commercial building construction (masonry) skill profile.

4. To help each student develop positive attitudes and ideals related to their occupation in commercial building construction (masonry) and understand their own capabilities and potential.

5. To instill in each student the need to plan for their professional growth through continuous learning in their chosen occupation.

## STUDENT ACTIVITIES

All students enrolled in the Ocean County Vocational-Technical School are encouraged to join Vocational Industrial Clubs of America (VICA). Student activities are infused into each program. Each building has a student government and a student activities program separate from VICA. Additionally, students from each center and every class are encouraged to participate in the VICA Leadership and Job Demonstration Contests which begin in the centers and radiate throughout the district as Ocean County Vocational-Technical School inter school winners are chosen.

Student activities emphasize the basic precepts of VICA, as well as the basic tenets of democracy. Within the context, each of our programs teaches the dignity of work, high standards in trade ethics and safety, and a belief in the free enterprise economic system.

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COMMERCIAL BUILDING CONSTRUCTION (MASONRY)


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**UNIT:** ORIENTATION



**TOPIC:** SCHOOL POLICIES AND REGULATIONS

## Task

I. Identify and discuss school policies and rules

II. Identify and discuss class policies and rules

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## Theory

A. Student handbook

1. Introduction to vocational education
2. Student rights
3. Affirmative Action statement
4. Student grivance policy
5. Student expectations
6. Student and state law
7. Submission of pupils to authority
8. Authority over pupils
9. Corporal punishment
10. Liability of parents
11. Discipline code
12. Graduation policy
13. Certificates
14. Transfers
15. School calendar
16. Activities
17. Student records
18. Accidents
19. Adult students
20. Bedside instruction
21. Change of address
22. Cooperative Industrial Education (C.I.E.)
23. Class times
24. Driving policy
25. Drug and alcohol policy
26. Lockers
27. Missing the bus
28. School closing
29. Smoking
30. Student dress
31. Progress reports
32. Rights for married and pregnant students
33. Telephones
34. Theft and theft report
35. Tools and equipment control
36. Visitors
37. Student record statement

## Communication Skills

A. Functional reading skills

1. Textbook
2. Handbook
3. Handouts

B. Outlining and note taking

1. Handbook
2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

M. Resume writing

N. Job application skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Formulas

F. Graphs

## Science Knowledge

A. Chemistry

1. Chemical reactions
2. Flammable, toxic and volitile chemicals
3. Toxic fumes
4. Catalyst

B. Physics

1. Strength
2. Work
3. Forces
4. Motion
5. Leverage

C. Biology

1. Human anatomy and work movements
2. Health and work
3. Protecting self and other life forms

D. Earth science

1. Natural resources
2. Protecting the environment

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## Student Outcome

A. The student will be able to describe the units of the course

B. The student will be able to describe the grading system

C. The student will be able to demonstrate a safe and orderly exit

D. The student will be able to interpret the student handbook and follow all school and class rules

E. The student will be able to describe and follow all general safety regulations

F. The student will be able to describe the Cooperative Industrial Education program (C.I.E.)

G. The student will be able to describe Vocational Industrial Clubs of America (VICA)

H. The student will be able to complete a job application and resume

I. The student will be able to pass a written orientation exam with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | B. Class policies and rules<br><br>1. Instructional units<br>2. Grading system<br>3. Student personnel system<br>4. Firedrill procedure<br>5. Accident procedure<br>6. Job description<br>7. Project assignments<br>8. Classroom procedure<br>9. Live job site procedure<br>10. General safety regulations<br>11. Student attendance contract<br>12. Vocational Industrial Clubs of America (VICA)<br>13. Resume and job applications<br>14. References<br>15. Honor awards<br>16. Scholarships<br>17. Guidance services<br>18. Math and reading assistance<br>19. Make-up work | | | | |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. List different opportunities available in the masonry field and related carpentry field | A. Career opportunities in the masonry trades<br>1. Laborer - helper<br>2. Apprentice<br>3. Surveyor<br>4. Design drafter<br>5. Construction code officer<br>6. Estimator<br>7. Concrete mason<br>8. Block mason<br>9. Brick mason<br>10. Stonemason<br>11. Foreman<br>12. Corporate officer<br>13. Material manufacture<br>14. Material sales<br>15. Tile mason<br>B. Career opportunities in the related carpentry trades<br>1. Carpenter<br>2. Carpenter's helper<br>3. Apprentice<br>4. Design drafter<br>5. Estimator<br>6. Construction code officer<br>7. Surveyor<br>8. Sider<br>9. Painter<br>10. Material sales<br>11. Drywall installer | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills<br>M. Interpretation of blueprints<br>N. Resume writing<br>O. Job application skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>B. Physics<br>1. Strenght<br>2. Work<br>3. Forces<br>4. Motion<br>5. Leverage<br>6. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to demonstrate a knowledge of work with masonry and wood materials<br>B. The student will be able to sketch house plans<br>C. The student will be able to calculate materials needed to construct specific structures<br>D. The student will be able to identify basic building codes<br>E. The student will be able to complete basic survey work for home construction<br>F. The student will be able to describe job opportunities in the masonry and carpentry fields<br>G. The student will be able to describe the educational and work related backgrounds necessary for trade advancement |

**UNIT:** SAFETY

**TOPIC:**

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Work safely in the shop<br><br>II. Work safely on the actual construction site<br><br>III. Develop a safe working attitude | A. Shop safety<br>1. Material handling<br>2. Material storage<br>3. What makes a safe working environment<br>B. Construction site safety<br>1. Similarities to shop<br>2. Dissimilarities to shop environment<br>3. Taking precautions<br>4. Special stiudations<br>C. Clothing and personal protective devices<br>D. Tools and equipment<br>1. Hand<br>2. Power<br>E. Ladders, footplanks and scaffold safety<br>F. Lifting, carrying and handling materials<br>G. Fire safety<br>H. Eye safety<br>I. Hearing safety<br>J. Electrical safety<br>K. Developing a safe working attitude<br>1. If you do not know exactly what you are doing, do not do it - find out the proper methods from an authorized person<br>2. Learn from others' experiences<br>3. Never assume anything<br>4. Safety first<br>5. Other considerations | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Formulas<br>H. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to explain and demonstrate safe working habits<br>B. The student will be able to describe proper clothing and individual protective devices used in construction<br>C. The student will be able to select and use proper tools and equipment for specific jobs<br>D. The student will be able to demonstrate the safe use of ladders, footplanks and scaffolding<br>E. The student will be able to lift objects properly by using the legs bent and other recommended practices<br>F. The student will be able to describe fire hazards and describe methods of control and extinguishing<br>G. The student will be able to pass a safety test with 100% accuracy<br>H. The student will be able to demonstrate the proper use of hand tools, equipment, materials and a positive safe attitude to the expectations of the instructor |

**UNIT:** HAND TOOLS

**TOPIC:** CARPENTRY HAND TOOLS

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. List the hand tools used in the construction trades, specifically carpentry | A. Measuring tools and layout tools<br>B. Sawing tools<br>C. Edge cutting tools<br>D. Drilling and boring tools<br>E. Fastening and disassembling tools<br>F. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>3. Shop signs<br>4. Bulletin boards<br>5. Safety charts<br>6. Newspaper articles<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Atomic structure<br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Molecular structure<br>8. Weight<br>9. Vector forces<br>10. Motion<br>11. Leverage<br>12. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to demonstrate the proper choice of individual tools for specific job requirements<br>B. The student will be able to describe the specific tools used in the carpentry trades<br>C. The student will be able to use carpentry tools to complete specified projects |

**UNIT:** HAND TOOLS - CONTINUED

**TOPIC:** MEASURING AND LAYOUT TOOLS

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of measuring and layout hand tools | A. Folding wood rule<br>B. Modular rule<br>C. Brickspacing rule<br>D. Reel tapes<br>E. Layout tape<br>F. Combination square<br>G. Try-square<br>H. Rafter square<br>I. Sliding "T" bevel<br>J. Two foot plumb rule<br>K. Four foot plumb rule<br>L. Torpedo level<br>M. Line level<br>N. Scratch awl<br>O. Plumb bob<br>P. Chalk line<br>Q. Marking tools<br>R. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs<br>L. Basic trigonometric functions | A. Chemistry<br>1. Chemical reactions<br>2. Solvents<br>3. Grease<br>4. Oil<br>5. Atomic structure<br>B. Physics<br>1. Heat and energy<br>2. Strength<br>3. Work<br>4. Forces<br>5. Color<br>6. Molecular structure<br>7. Weight<br>8. Vector forces<br>9. Motion<br>10. Leverage<br>11. Optics<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to measure short distance or pieces of materials<br>B. The student will be able to measure long distances as in a foundation layout<br>C. The student will be able to gauge a line for cutting lumber and other materials<br>D. The student will be able to check materials for square<br>E. The student will be able to layout pitch for rafters<br>F. The student will be able to transfer angle of 0° to 180° on specific materials<br>G. The student will be able to construct walls both level and plumb<br>H. The student will be able to locate a point of measurement<br>I. The student will be able to transfer lines to widely distant points<br>J. The student will be able to transfer measurements<br>K. The student will be able to identify parts of a try square<br>L. The student will be able to layout common rafters<br>M. The student will be able to use a chalk line for a straight line<br>N. The student will be able to identify measuring tools |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | | | | | O. The student will be able to use a modular or brick-spacing rule for brick layout and block layout<br><br>P. The student will be able to pass a written test on measuring and layout tools with 70% accuracy |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of sawing tools | A. Cross cut<br>B. Rip saw<br>C. Back saw<br>D. Hack saw<br>E. Keyhole saw<br>F. Coping saw<br>G. Drywall saw<br>H. Miter box saw<br>I. Dovetail saw<br>J. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs<br>L. Basic trigonometric functions | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>6. Solvents<br>7. Oil<br>B. Physics<br>1. Friction<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify parts and describe angular design of cross saw to cut lumber across grain<br>B. The student will be able to identify parts and describe angular design of rip saw to cut lumber with grain<br>C. The student will be able to identify parts and describe design for fine cutting of wood materials<br>D. The student will be able to identify parts and describe design for cutting steel and plastic<br>E. The student will be able to identify parts and describe design for cutting circular holes in lumber<br>F. The student will be able to identify parts and describe design to cut drywall<br>G. The student will be able to identify parts and describe design to cut fine softwood moldings<br>H. The student will be able to list and demonstrate the use of all saws |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of edge cutting tools | A. Cabinet maker's plane<br>B. Block plane<br>C. Rabbet plane<br>D. Jack plane<br>E. Utility knife<br>F. Putty knife<br>G. Scraper<br>H. Wood chisels<br>I. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Solvents<br>3. Catalyst<br>4. Oil<br>5. Atomic structure<br>6. Grease<br>B. Physics<br>1. Friction<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify and demonstrate the use of edge cutting tools<br>B. The student will be able to identify parts of a plane<br>C. The student will be able to surface a piece of lumber stock flat and true<br>D. The student will be able to plane the end grain of lumber<br>E. The student will be able to cut various wood joints to specifications<br>F. The student will be able to demonstrate the proper choice and use of edge cutting tools |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of drilling and boring tools | A. Auger bits<br>B. Auger brace<br>C. Hand drill<br>D. Counter sink<br>E. Drill depth gauge<br>F. Expansion bit<br>G. Push drill<br>H. Drills<br>I. Masonry drill bits<br>K. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Solvents<br>3. Oil<br>4. Bonding of molecules<br>5. Atomic structure<br>6. Grease<br>B. Physics<br>1. Friction<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Torque<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify all drilling and boring tools used in carpentry<br>B. The student will be able to list all drilling and boring tools used in carpentry<br>C. The student will be able to demonstrate the proper use of drilling and boring tools<br>D. The student will be able to drill holes of proper size and depth<br>E. The student will be able to expand bits and drill holes of different sizes<br>F. The student will be able to demonstrate the proper use of masonry drill bits |

**UNIT:** HAND TOOLS - CONTINUED

**TOPIC:** FASTENING AND DISASSEMBLING TOOLS

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of fastening and disassembling tools | A. Screwdrivers<br>B. Adjustable wrench<br>C. Wrench set<br>D. Nailset<br>E. Spiral ratchet screwdriver<br>F. Pliers<br>G. Ripping crow bar<br>H. Wonder ripping bar<br>I. Claw hammer<br>J. Mason hammer<br>K. Mason brick set chisel<br>L. Other tools as required by specific tasks | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Solvents<br>3. Oil<br>4. Bonding of molecules<br>5. Atomic structure<br>6. Grease<br>7. Heat of reactions<br>B. Physics<br>1. Friction<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Torque<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to drive nails and remove nail fasteners from various materials<br>B. The student will be able to install wood and masonry screws and fasteners<br>C. The student will be able to drive nails below wood surface<br>D. The student will be able to use leverage tools to remove nails<br>E. The student will be able to identify all fastening tools<br>F. The student will be able to demonstrate the proper use of fastening and disassembling tools<br>G. The student will be able to cut masonry materials using a masonry hammer and brick set chisel<br>H. The student will be able to pass a written test with 70% accuracy |

**UNIT:** HAND TOOLS - CONTINUED

**TOPIC:** MASONRY TOOLS USED IN CONSTRUCTION

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Use of masonry hand tools (aside from previously mentioned hand tools) | A. Trowels<br>1. Standard mason's trowel<br>2. Plastering trowel<br>3. Concrete trowel<br>4. Pointing trowel<br>5. Slicker<br>6. Margin trowel<br>B. Floats<br>1. Wood float<br>2. Rubber float<br>3. Sponge float<br>4. Magnesium float<br>5. Darby float<br>6. Bull float<br>C. Jointers<br>1. "S" concave jointer<br>2. "S" convex jointer<br>3. Sled runner jointer<br>4. Grapevine jointer<br>5. Skate whell jointer<br>D. Line holding devices<br>1. Line stretchers<br>2. Line blocks<br>3. Mason's line<br>4. Line pins<br>5. Line twig or trigger<br>E. Miscellaneous mason tools<br>1. Bolt cutters<br>2. Mash hammer<br>3. Concrete edge and grovers<br>4. Chisels<br>5. Hoes<br>6. Brick tongs<br>7. Mortar pans and boxes<br>8. Wheelbarrows<br>9. Rubber pails<br>10. Hoist puller | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>6. Cement ingredients and chemical nature<br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify and demonstrate the proper use of masonry hand tools<br>B. The student will be able to spread mortar and concrete with appropriate trowels<br>C. The student will be able to attach a mason line for construction using the proper hand tools<br>D. The student will be able to finish block and brick work using proper finishing tools for specifications<br>E. The student will be able to finish concrete to the desired specifications using the proper hand tools<br>F. The student will be able to move materials using the proper hand tools<br>G. The student will be able to demonstrate the cutting of reinforcing wire using boltcutters<br>H. The student will be able to demonstrate the use of concrete spreading tools<br>I. The student will be able to drive stakes using either mash or sledge hammers<br>J. The student will be able to float a plastered wall or concrete to the desired texture using the appropriate tools |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 11. Brushes<br>12. Concrete broom<br>13. Scarrifer<br>14. Jitterbug<br>15. Shovels<br>16. Cum-a-long<br>17. Wire twister<br>18. Rub brick<br>19. Screed<br>20. Compressed air sprayer<br>21. Squeegee<br>22. Knee pads<br>23. Sledge hammer<br>24. Other tools as required by specific tasks | | | | K. The student will be able to determine which hand tool should be used to complete a specified masonry task<br><br>L. The student will be able to identify all masonry. hand tools<br><br>M. The student will be able to pass a written test with 70% accuracy |

## Task

I. Identify the parts of a mortar mixer

II. Mix mortar using a gas mortar mixer

III. Maintain a mortar mixer

IV. Operate a mortar mixer safely

## Theory

A. Parts of a mortar mixer
   1. Engine
   2. Drum
   3. Paddles
   4. Guards
   5. Wheels
   6. Tow bar
   7. Engaging lever
   8. Grease fittings
   9. Gas tank
   10. Oil fill cap
   11. Choke
   12. Spark plug shut-off
   13. Ground wire stop
   14. Drum release lever
   15. Drum handle
   16. Starter rope
   17. Engine cooling fins

B. Mixing mortar
   1. Safety inspection of mixer
   2. Add water
   3. Start mixer
   4. Engage drum
   5. Wet down mixer
   6. Add ½ sand
   7. Add cement ingredients
   8. Add water when necessary
   9. Add remaining sand
   10. Mix time
   11. Empty mixer
   12. Add water
   13. Wet down mixer
   14. Disengage drum
   15. Stop engine

C. Maintaining a gas mortar mixer
   1. Inspections
   2. Lubrication
   3. Gas fill
   4. Air filter
   5. Spark plug
   6. Oil fill and change
   7. Paddle adjustments
   8. Belts
   9. Cleaning

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of a gas mortar mixer

B. The student will be able to mix mortar using a gas mortar mixer

C. The student will be able to maintain a mortar mixer

D. The student will be able to pass a mortar mixer safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | D. Mortar mixer safety<br>1. Working with gas<br>2. Use of guards<br>3. Starting and stopping engine<br>4. Unloading and handle<br>5. Protective goggles and clothing<br>6. If mortar should get in the eyes<br>7. Handling bags of cement ingredients<br>8. Cleaning mixer<br>9. Avoiding hot parts of engine<br>10. Avoiding splashes<br>11. Inspections<br>12. Other considerations | | | | |

**UNIT:** EQUIPMENT USE AND MAINTENANCE - CONTINUED

**TOPIC:** CONCRETE MIXER (ELECTRIC)

## Task

I. Identify the parts of a concrete mixer

II. Mix concrete using an electric concrete mixer

III. Maintain a concrete mixer

IV. Operate a concrete mixer safely

## Theory

A. Parts of a concrete mixer
   1. Motor
   2. Electric cord and plug
   3. Drum
   4. Drum fins
   5. Belts
   6. Wheels
   7. Tow bar
   8. Guards
   9. Gears
   10. Release lever
   11. Drum handle
   12. Grease fittings

B. Mixing concrete
   1. Safety inspection of mixer and electric cords
   2. Start mixer
   3. Add water
   4. Add ½ sand
   5. Add cement ingredients
   6. Add water when necessary
   7. Add remaining sand and ingredients
   8. Mix time
   9. Empty mixer
   10. Add water
   11. Stop mixer

C. Maintaining and electric concrete mixer
   1. Inspection
   2. Lubrication
   3. Belts
   4. Power cord and plug
   5. Cleaning

D. Concrete mixer safety
   1. Working with electric
   2. Ground fault interrupter
   3. Use of guards
   4. Avoiding inside of drum, outside of drum, gears and moving parts
   5. Unloading and handle
   6. Position of drum

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of an electric concrete mixer

B. The student will be able to mix concrete using an electric concrete mixer

C. The student will be able to maintain an electric concrete mixer

D. The student will be able to pass an electric concrete mixer safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 7. Protective goggles and clothing<br>8. If concrete should get in the eyes<br>9. Handling bags of cement ingredients<br>10. Cleaning mixer<br>11. Avoiding splashes<br>12. Inspections<br>13. Other considerations | | | | |

## Task

I. Identify the parts of a hydraulic masonry splitter

II. Cut masonry materials on a hyrdaulic masonry splitter

III. Maintain a hydraulic masonry splitter

IV. Operate a hydraulic masonry splitter safely

## Theory

A. Parts of a hydraulic masonry splitter
   1. Hydraulic cylinder
   2. Table
   3. Cutting blades
   4. Safety material holders
   5. Springs
   6. Pedals
   7. Wheels
   8. Handles
   9. Hydraulic fluid container
   10. Pump unit
   11. Grease fittings
   12. Frame

B. Cutting masonry units
   1. Types of materials that can be split
   2. Sizes of materials that can be split
   3. Inspection of splitter
   4. Set up of splitter
   5. Marking material for cut
   6. Positioning of material to be cut
   7. Use of high pressure pedal to raise table
   8. Use of high volume pedal to raise table
   9. Splitting material
   10. Release of material and table
   11. Cleaning splitter
   12. Storing splitter

C. Maintain a hydraulic masonry splitter
   1. Inspections
   2. Lubrication
   3. Hydraulic fluid
   4. Keeping clean
   5. Cleaning breather

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vecto_ forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Hydraulics
   16. Fluid dynamics

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of a hydraulic masonry splitter

B. The student will be able to cut masonry materials on a hydraulic masonry splitter

C. The student will be able to maintain a hydraulic masonry splitter

D. The student will be able to pass a hydraulic splitter safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | D. Hydraulic splitter safety<br>1. Working with hydraulic equipment<br>2. Use of guards<br>3. Operation in a safe manner<br>4. Keeping splitter clean<br>5. Centering your work<br>6. Never jump on pedals<br>7. Use of only proper hydraulic fluid<br>8. Position standing during operation<br>9. Safety eye protection<br>10. Safe cuts<br>11. Avoiding materials<br>12. Inspections<br>13. Other considerations | | | | |

## Task

I. Identify the parts of diamond blade masonry saw

II. Cut masonry materials on a diamond blade masonry saw

III. Maintain a diamond blade masonry saw

IV. Operate a diamond blade masonry saw safely

## Theory

A. Parts of a diamond blade masonry saw
   1. Frame
   2. Water pump
   3. Motor
   4. Switches
   5. Wires and plugs
   6. Outlets
   7. Cutting head
   8. Diamond blade
   9. Conveyor cart
   10. Conveyor cart wheels
   11. High-low control
   12. Foot pedal
   13. Ground fault interrupter
   14. Blade shaft assembly
   15. Collars
   16. Guards
   17. Pulley belts
   18. Guard-lite
   19. Water tubes
   20. Water valves
   21. Drain and drain hose
   22. Splash curtain
   23. Measuring guide
   24. Wood insert on conveyor cart
   25. Other parts as necessary

B. Cutting masonry materials on the diamond blade masonry saw
   1. Safety inspection of saw, GFI switch and diamond blade
   2. Saw set up
   3. Marking material to be cut
   4. Positioning material on conveyor cart
   5. Checking conveyor
   6. Starting saw
   7. Cutting procedures
   8. Actually cutting different types of masonry materials
   9. Completing a cut
   10. Turning the saw off
   11. Cleaning the saw

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque
   16. Fluid dynamics

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of a diamond blade masonry saw

B. The student will be able to cut masonry units on a diamond blade masonry saw

C. The student will be able to maintain a diamond blade masonry saw

D. The student will be able to pass a diamond blade masonry saw safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 12. Storage of saw till further use<br>13. Other considerations<br><br>C. Maintaining a diamond blade masonry saw<br>1. Inspections<br>2. Lubrication<br>3. Belts<br>4. Guards and their operation<br>5. Pump, hoses and valves<br>6. Motor and electric current<br>7. Wires, plugs and GFI<br>8. Conveyor cart operation<br>9. Wood insert replacement<br>10. Pedal operation<br>11. Cleaning<br>12. Storing blade<br>13. Other considerations<br><br>D. Diamond blade masonry saw safety<br>1. Working with electric<br>2. Use of ground fault interrupter<br>3. Use of guards<br>4. Starting and stopping<br>5. Position of blade on cutting surface of material<br>6. Body and hand positions<br>7. Protective eye wear<br>8. Blade inspection<br>9. Proper cutting techniques<br>10. Types of materials that can be cut<br>11. Blade types and selection<br>12. Inspections<br>13. Other considerations | | | | |

## Task

I. Identify the parts of a rod cutter and bender

II. Cut rebar with a rod cutter and bender

III. Bend rebar with a rod cutter and bender

IV. Maintain a rod cutter and bender

V. Operate a rod cutter and bender in a safe manner

## Theory

A. Parts of a rod cutter and bender
   1. Handle
   2. Blades
   3. Lubrication fitting
   4. Cutting point mark
   5. Base
   6. Roller for bender
   7. Grips for bender
   8. Handle lock

B. Cut rebar with a rod cutter and bender
   1. Selection of rebar
   2. Marking rebar for cut
   3. Place rebar in cutter
   4. Position handle as required
   5. Cutting rebar
   6. Removing rebar from cutter

C. Bend rebar with a rod cutter and bender
   1. Selection of rebar
   2. Marking rebar for bending
   3. Handle position for bend
   4. Place rebar on bender
   5. Making the actual bend
   6. Compound bends
   7. Maintaining accurate bends

D. Maintain a rod cutter and bender
   1. Grease fitting
   2. Replacement blades
   3. Proper attachment to base
   4. Inspection

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of a rod cutter and bender

B. The student will be able to cut rebar to desired lengths

C. The student will be able to bend rebar to specifications

D. The student will be able to maintain a rod cutter and bender

E. The student will be able to cut and bend rebar in a safe manner

F. The student will be able to pass a rod cutter and bender safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | E. Rod cutter and bender safety<br><br>1. Inspections<br>2. Sound surface to cut on<br>3. Moving bender<br>4. Handle lock<br>5. Handling handle<br>6. Size restrictions on cutting and bending specific rebars<br>7. Quality of rebar for bends<br>8. Position of self and hands for cutting and bending<br>9. Balance when cutting and bending<br>10. Working with two people cutting and bending<br>11. Protective eyeguards and clothing<br>12. Handling rebar<br>13. Other considerations | | | | |

**UNIT:** EQUIPMENT USE AND MAINTENANCE - CONTINUED

**TOPIC:** TRANSIT

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Identify the parts of transit and associated tools<br><br>II. Set up a transit and determine heights<br><br>III. Shoot angles with a transit<br><br>IV. Maintain a transit<br><br>V. Work safely with a transit | A. Parts of a transit<br>1. Telescope<br>2. Tripod<br>3. Focus knob<br>4. Lenses<br>5. Eyepiece<br>6. Adjusting screws<br>7. Leveling screws<br>8. Horizontal tangential adjusting screw and clamp<br>9. Vertical tangential adjusting screw and clamp<br>10. Mounting cup<br>11. Mounting stud<br>12. Horizontal and vertical degree scales<br>13. Cross hairs<br>14. Venier reading devices<br>15. Difference between dumpy level and a transit<br>16. Transit rod<br><br>B. Transit set up<br>1. Location<br>2. Tripod set up<br>3. Assemble transit base to tripod<br>4. Adjusting leveling screws<br>5. Checking transit for accuracy<br><br>C. Determine heights with a transit<br>1. Bench marks<br>2. Reading and record heights<br>3. Compare heights and determine average height<br>4. Determine how specific heights vary from an average height<br>5. Set stakes to a specified height | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br><br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br><br>C. Vocabulary<br><br>D. Spelling<br><br>E. Inferences<br><br>F. Following directions<br><br>G. Interpretation of diagrams<br><br>H. Interpretation of graphs, charts and drawings<br><br>I. Test taking skills<br><br>J. Problem solving<br><br>K. Oral communications<br><br>L. Study skills | A. Whole numbers<br><br>B. Common fractions<br><br>C. Decimals<br><br>D. Percentages<br><br>E. Weights and measurements<br><br>F. Ratio and proportion<br><br>G. Powers and roots<br><br>H. Formulas<br><br>I. Estimating<br><br>J. Geometry<br><br>K. Graphs<br><br>L. Basic trigonometric functions | A. Chemistry<br>1. Bonding of molecules<br>2. Atomic structure<br><br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br><br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br><br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify the parts of a transit and dumpy level<br><br>B. The student will be able to set up and level a transit<br><br>C. The student will be able to determine height using a transit<br><br>D. The student will be able to determine and shoot different specified angles with a transit<br><br>E. The student will be able to maintain a transit<br><br>F. The student will be able to work safely with a transit and pass a transit safety test with 100% accuracy<br><br>G. The student will be able to pass a transit exam with 70% accuracy |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | D. Shoot angles with a transit<br>1. Transit set up and location<br>2. Shooting a 90° angle<br>3. Determining specific angles<br>4. Shooting specific angles other than 90°<br>5. Use of the vernier scales when shooting<br>E. Maintaining a transit<br>1. Keeping lenses clean<br>2. Handling and storing a transit<br>3. Inspecting a transit for accuracy<br>4. Sending a transit for recalibration<br>F. Working safely with a transit<br>1. Handling the transit<br>2. Handling those tools associated with a transit, specifically, the transit rod<br>3. Other considerations | | | | |

UNIT: EQUIPMENT USE AND MAINTENANCE - CONTINUED

TOPIC: CARPENTER'S PORTABLE CIRCULAR SAW

## Task

I. Identify the parts of a saw

II. Make specific cuts with a saw

III. Maintain a saw

IV. Operate a saw safely

## Theory

A. Parts of the saw
   1. Handle
   2. Blade
   3. Blade types
   4. Upper guard
   5. Telescoping guard
   6. Motor
   7. Tilt adjustment
   8. Hand knob
   9. Shoe or base
   10. Depth adjustment
   11. Electric cord and plug
   12. Other parts specific to specific saws

B. Selection of blades
   1. Material to be cut
   2. Ripping
   3. Bevel cutting
   4. Pocket cuts
   5. Other considerations

C. Make specific cuts with a saw
   1. Cross-cutting
   2. Ripping
   3. Bevel cutting
   4. Pocket cuts
   5. Other considerations

D. Maintain a saw
   1. Keep tool clean
   2. Lubrication
   3. Service and reapir
   4. Inspections

E. Operate a saw safely
   1. Inspections
   2. Keeping work area clean
   3. Avoid dangerous environment
   4. Keep children away
   5. Store idle tool
   6. Use right tool
   7. Do not force tool

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of a saw

B. The student will be able to select the proper blade for a saw

C. The student will be able to set up the saw for a specific job

D. The student will be able to make specific cuts with a saw

E. The student will be able to maintain a saw

F. The student will be able to work safely with a saw and pass a saw safety test with 100% accuracy

G. The student will be able to pass a written test with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 8. Wear proper eye protection and clothes<br>9. Do not abuse cord<br>10. Secure work<br>11. Do not overreach<br>12. Maintain tools with care<br>13. Disconnect tools when making adjustments<br>14. Remove adjusting keys and wrenches<br>15. Avoid accidental starting<br>16. Cautions working outside<br>17. Only use approved and proper accessories<br>18. Do not use tools with warped or cracked housing<br>19. Keep blades sharp<br>20. Keep guards in place<br>21. Keep hands away from cutting area<br>22. Keep guards in working order<br>23. Never reach under the material when cutting<br>24. Inspections<br>25. Avoid contact with metal surfaces<br>26. Other considerations | | | | |

## Task

I. Identify the parts of a grinder

II. Use a grinder to sharpen tools

III. Maintain an electric grinder

IV. Operate an electric grinder safely



## Theory

A. Parts of an electric grinder
   1. Eye-shield adjustment
   2. Eye shield
   3. Abrasive wheel
   4. Adjustable tool rest
   5. Bench mounting slot
   6. Wheel guard
   7. Motor housing
   8. On/off switch
   9. Abrasive wheel, brush and buffer
   10. Base
   11. Water trough
   12. Tool rest

B. Use of an electric grinder
   1. Safety inspection
   2. Adjustments
   3. On/off button
   4. Positioning material to be worked
   5. Movement across wheel to prevent overheat
   6. Water trough use
   7. Removing burrs
   8. Sharpening

C. Maintain an electric grinder
   1. Clean machine after use
   2. Dressing the wheel
   3. Other considerations

D. Operating an electric grinder safely
   1. Specific eye protective devices
   2. When and how to make adjustments to the grinder
   3. Not to use cracked or chipped wheel
   4. Use of tool rest
   5. Never hold stock or tool with a rag
   6. Never stop the wheel with anything, let it stop by itself

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Formulas

H. Estimating

I. Geometry

J. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of an electric grinder

B. The student will be able to sharpen tools using an electric grinder

C. The student will be able to remove burrs from a tool using an electric grinder

D. The student will be able to maintain an electric grinder

E. The student will be able to pass an electric grinder safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 7. Use of water cup<br>8. Keeping area clean<br>9. Watch for hot metal<br>10. Grinding of masonry tools<br>11. Use of tuck-pointer grinder on the job<br>12. Dust mask<br>13. Other considerations<br>14. Note operator's manual<br>15. Inspection of wheel and grinder in general | | | | |

## Task

I. Identify the parts of an electric drill

II. Use a drill to drill holes

III. Maintain an electric drill

IV. Operate an electric drill safely

## Theory

A. Parts of an electric drill
   1. Insulate trigger switch
   2. Cord strain reliever
   3. Motor cooling fan
   4. Ball bearings
   5. Geared key chuck
   6. Reduction gears
   7. Armature
   8. Field winding
   9. Brushes
   10. Aluminum or plastic housing
   11. Pistol grip handle
   12. Grounded plug
   13. Other considerations

B. Use of an electric drill
   1. Selection of drill bits
   2. Grounding instructions
   3. Extension cord use
   4. Chuck
   5. Trigger speed control
   6. Reversing direction of rotation
   7. Side handle
   8. Stalling
   9. Starting
   10. Speed
   11. Typical applications
      a. drilling wood composition materials, etc.
      b. drilling metals
      c. drilling masonry
      d. driving screws
   12. Other considerations

C. Maintain an electric drill
   1. Quik-lok cord set
   2. Chuck removal
   3. Lubrication
   4. Brushes and commutator
   5. Sharpening drill bit
   6. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify the parts of an electric drill and associated bits

B. The student will be able to operate an electric drill for various tasks

C. The student will be able to maintain an electric drill and associated attachments i.e., drill bits

D. The student will be able to operate an electric drill in a safe manner

E. The student will be able to pass an electric drill safety exam with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | D. Operating an electric drill in a safe manner<br><br>1. Selection of correct drill bit<br>2. Holding material to be drilled<br>3. Holding drill<br>4. Grounding and ground fault interrupter<br>5. Turning on and off<br>6. Feeding drill into work<br>7. Keeping the drill aligned in a direction<br>8. Keeping the bit from overheating<br>9. Remove bit from drill when work is done<br>10. Inspection<br>11. Other considerations | | | | |

## Task

I. Identify the parts of a ladder and scaffold

II. Work on a scaffold and ladder

III. Maintain a scaffold and ladder

IV. Work safely on a ladder or scaffold

## Theory

A. Identify parts of a ladder
   1. Types of ladders
   2. Rungs
   3. Pulleys
   4. Fittings
   5. Locks
   6. Pinch points
   7. Hinges
   8. Base "feet"
   9. Material platform
   10. Frames

B. Identify parts of a foot plank
   1. Supports
   2. Planks
   3. Other considerations

C. Identify parts of steel tubular scaffolding
   1. End frames
   2. Pins
   3. Cross braces
   4. Horizontal-diagonal brace
   5. Wheels
   6. Base plate
   7. Adjustable base plate
   8. Planks
   9. Guard rail posts
   10. Guard rails
   11. Mid rails
   12. Toe boards
   13. Toe board clips
   14. Ladder rungs
   15. Outriggers
   16. Other considerations

D. Working on scaffold and ladders
   1. Set up and use of different types of ladders
   2. Set up and use of a foot scaffolding
   3. Set up, disassembly and working on a steel tubular scaffold

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Friction
   15. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify different types of ladders

B. The student will be able to identify parts of different types of ladders

C. The student will be able to identify a foot scaffold and associated parts

D. The student will be able to identify the parts of a steel tubular scaffold and associated parts

E. The student will be able to work on ladders, foot planks and steel tubular scaffolding

F. The student will be able to maintain, erect, disassemble and care for ladders, foot planks and steel tubular scaffolding

G. The student will be able to work safely on ladders, foot planks and steel tubular scaffolding

H. The student will be able to pass a scaffold and ladder safety exam with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | E. Maintain ladders and scaffolding<br>1. Keeping equipment clean<br>2. Keeping fittings tight<br>3. Lubrication<br>4. Replacing frayed or worn rope on extension ladders<br>5. Inspections<br>6. Other considerations<br>F. Safety rules for ladders<br>1. Inspections<br>2. Placement of ladders<br>3. Solid footings<br>4. Safety shoes where the bottom might slip<br>5. Pinch points<br>6. Angle of respose<br>7. Always face ladder when using, climbing or descending<br>8. Other considerations<br>G. Safety rules for foot planks<br>1. Erecting safely<br>2. Working on safely<br>3. Other considerations<br>H. Safety rules for steel tubular scaffolding<br>1. Inspections<br>2. OSHA regulations<br>3. Adequate skills<br>4. Plumb and level<br>5. Guardrails, toeboards<br>6. Caution around power lines<br>7. Plank safety<br>8. Rolling scaffolds<br>9. Placement of materials<br>10. Working with others<br>11. During erection and take down<br>12. Other considerations | | | | |

## Task

I. Identify different types of forklifts

II. Identify parts of a forklift

III. Operate a forklift

IV. Maintain a forklift

V. Operate a forklift and work with and around a forklift in a safe manner



## Theory

A. Types of forklifts
   1. Mast
   2. Boom
   3. Gas, diesel, etc.
   4. Other considerations

B. Parts of a forklift
   1. Mast
   2. Carriage
   3. Hydraulics
   4. Tires
   5. Treads
   6. Controls
   7. Engine
   8. Transmissions
   9. Forks
   10. Cylinders
   11. Axles and brakes
   12. Counterweights
   13. Uprights
   14. Attachments
   15. Optional equipment
   16. Other considerations

C. Operate a forklift
   1. Prepare materials to be moved
   2. Loading
   3. Unloading
   4. Driving
   5. Controls
   6. Inspections
   7. Lock levers
   8. Protection
   9. Other considerations

D. Maintain a forklift
   1. Hydraulics
   2. Brakes
   3. Tire pressure
   4. Engine
   5. Transmission
   6. Body
   7. Frame
   8. Chains
   9. Controls
   10. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify different types of forklifts

B. The student will be able to identify the parts of a forklift

C. The student will be able to operate a forklift

D. The student will be able to maintain a forklift

E. The student will be able to operate a forklift safely and work around a forklift safely

F. The student will be able to pass a forklift safety test with 100% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | E. Operate and work around a forklift safely<br>1. Rough terrain forklift<br>2. Know the capacity and operating characteristics<br>3. Do not modify parts<br>4. Buckle up<br>5. Watch for others<br>6. Carry loads low<br>7. When you shut the machine down, proper procedures<br>8. Protective equipment to wear<br>9. Know your equipment<br>10. Read manufacturer's operator's manual<br>11. Use all available protective and safety devices<br>12. Inspections<br>13. Clean up<br>14. Check work area<br>15. Fueling<br>16. Mounting<br>17. Starting<br>18. Testing controls<br>19. Balance<br>20. Follow safe operating practices<br>21. Lift the load safely<br>22. Transport the load safely<br>23. Hazardous loads<br>24. Hazardous working conditions<br>25. Load placement<br>26. Elevated placement<br>27. In specific environments<br>28. Transporting procedures<br>29. Rules of the road<br>30. Parking<br>31. Safe shutdown<br>32. Dismounting<br>33. Checking tires<br>34. Prepare work area<br>35. Prepare the machine<br>36. Avoid fires and explosion hazards<br>37. Avoid battery hazards | | | | |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 38. Avoid electrical hazards<br>39. Caution with hot cooling systems<br>40. Fluids under pressure<br>41. Signs and warning tags<br>42. Do not take chances<br>43. Safe limits<br>44. Service<br>45. Other considerations | | | | |

UNIT: BLUEPRINT READING

TOPIC: READS PLANS

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Read plans<br><br>II. Sketching plans | A. Blueprint parts<br>1. Foundation plan<br>2. Elevation plans<br>3. Floor plans<br>4. Section plans<br>5. Detail plans<br>6. Electrical and mechanical plans<br>7. Plumbing plans<br>8. Schedules<br>9. Specifications<br>10. Plot plans<br>11. Framing plan<br>12. Roofing plan<br>13. Other considerations<br><br>B. Blueprint sketching<br>1. Use of scale rule<br>2. Lines and dimension<br>3. Symbols | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br><br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br><br>C. Vocabulary<br><br>D. Spelling<br><br>E. Inferences<br><br>F. Following directions<br><br>G. Interpretation of diagrams<br><br>H. Interpretation of graphs, charts and drawings<br><br>I. Test taking skills<br><br>J. Problem solving<br><br>K. Oral communications<br><br>L. Study skills | A. Whole numbers<br><br>B. Common fractions<br><br>C. Decimals<br><br>D. Percentages<br><br>E. Weights and measurements<br><br>F. Ratio and proportion<br><br>G. Powers and roots<br><br>H. Formulas<br><br>I. Estimating<br><br>J. Geometry<br><br>K. Graphs<br><br>L. Basic trigonometric functions | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br><br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br><br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br><br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to locate and read sections and details on a written test<br><br>B. The student will be able to identify and read elevation readings on a written test<br><br>C. The student will be able to interpret foundation plans and related carpentry plans on a written test<br><br>D. The student will be able to pass a written test with 70% accuracy<br><br>E. The student will be able to read a scale rule on a written test<br><br>F. The student will be able to identify different types of lines and read dimensions from a print<br><br>G. The student will be able to interpret architecture symbols on a written test |

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Construct project from given set of blueprints<br><br>II. Layout project from prints<br><br>III. Build project to specifications | A. Conditions and information<br>B. Excavating and grading<br>C. Masonry and concrete work<br>D. Rough carpentry and roofing<br>E. Finish carpentry and millwork<br>F. Insulation, caulking and glazing<br>G. Plaster and drywall<br>H. Other considerations to take note while planning<br>I. Layout of projects from prints<br>J. Construction phases<br>K. Construction of project from blueprint set | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs<br>L. Basic trigonometric functions | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to construct various projects from given sets of actual blueprints<br>B. The student will be able to interpret various parts, views, dimensions and specifications to construct specific projects<br>C. The student will be able to construct a project from a blueprint on a performance test with 70% accuracy |

UNIT: CONCRETE

TOPIC: ESTABLISH GRADES

## Task

I. Establish grades from plot plans

II. Evaluate grade relationships on site

III. Determine finished floor height

IV. Read surveyor's elevations on stakes

V. Alter grade to desired heights



## Theory

A. Reading elevations from plot plans
   1. Review plan reading
   2. Comparison of heights from reference marker height

B. Evaluate grade relationships on site
   1. Tools for determining grade elevation
   2. Setting a reference height or bench mark
   3. Taking an average height
   4. Comparing specific heights to an average height or bench mark

C. Determine finished floor height
   1. Surveyor's stakes
   2. Blueprint specifications
   3. Calculating depth of excavation
   4. Calculating number of courses in a foundation
   5. Calculating final course of block in a foundation

D. Read surveyor's elevations on stakes
   1. Location of stakes
   2. Marks and indication on stakes

E. Alter grade to desired heights
   1. Removing soils
   2. Adding and compacting fill

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to establish grades from a plot plan

B. The student will be able to evaluate grades and their relationships using various tools and equipment on site

C. The student will be able to determine the finished floor height of a building from surveyor's stakes, blueprints and grade determinations

D. The student will be able to alter various grade heights on site by removing and adding fill where necessary

E. The student will be able to pass a written test on establishing grades with 70% accuracy

## Task

I. Locate and interpretation of surveyor's stakes

II. Location of building from plot plans

III. String lines from surveyor's stakes

IV. Plumb surveyor's lines to excavation

V. Set stakes for corners

VI. Check diagonal measurements and overall dimensions from prints

VII. Adjust stakes for proper square, dimensions and desired heights

VIII. Determine best stake system to use under different circumstances

## Theory

A. Surveyor's stakes
   1. Location
   2. Interpretation
   3. If missing, what to do

B. Plot plans and building location
   1. Reading plans
   2. Locating a building

C. String surveyor's line
   1. Clearing for lines
   2. Proper tension under specific conditions

D. Plumb surveyor's line to excavation
   1. Inspection of surveyor's lines
   2. Use of plumb bob
   3. Location of stakes in excavation from plumb lines

E. Set stakes at corners
   1. Initial stakes from surveyor's lines
   2. Measuring and locating stakes from initial stakes

F. Checking diagonal measurements and square building sections
   1. Calculation of diagonals from prints
   2. Square main building
   3. Square sections of building with reference to main building

G. Adjusting stakes
   1. When dimensions do not work out
   2. When diagonals are not equal
   3. Adjustments of stake heights

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to locate and interpret surveyor's stakes on site

B. The student will be able to locate building and dimension from a plot plan

C. The student will be able to string surveyor's lines and keep them free and clear under different conditions

D. The student will be able to plumb surveyor's lines and measurements to actual excavation

E. The student will be able to set stakes and batter boards for corner

F. The student will be able to check diagonal measurements, overall measurements and make adjustments to stakes where necessary to conform to prints

G. The student will be able to adjust stakes for square and proper heights

H. The student will be able to determine the most appropriate stake system to use under different circumstances

I. The student will be able to pass a written test on building layout with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | H. Stake systems<br><br>1. One stake method<br>2. Two stake method<br>3. Batter boards<br>4. Advantages and disadvantages | | | | |

## Task

I. Describe types of concrete ready-mix

II. Describe and identify different types of portland cement

III. Identify ingredients and proportions of ingredients for various mixes

IV. Describe slump of concrete

V. Measure ingredients for a concrete mix

VI. Mix concrete by hand

VII. Mix concrete using a mortar mixer and hand

VIII. Mix concrete in a power concrete mixer

IX. Use admixtures for special concrete mixes

## Theory

A. Types of ready-mix
   1. Nomenclature
   2. Portland types
   3. Ordering

B. Portland types
   1. Nomenclature
   2. Uses

C. Ingredients and proportions for concrete
   1. Portland types
   2. Sands
   3. Aggregates
   4. Water
   5. Admixtures
   6. Proportioning materials

D. Slump
   1. Determining
   2. Controlling

E. Measure ingredients
   1. Bag measurements
   2. Cubic feet
   3. Material need calculations
   4. Maintaining accurate proportions

F. Mix concrete by hand
   1. Sandwich arrangement
   2. Proportions
   3. Maintaining consistency and slump

G. Mix concrete with mortar mixer
   1. Mixing sand, portland and water
   2. Mixing aggregate by hand

H. Mix concrete in concrete mixer
   1. Adding ingredients
   2. Mixing time
   3. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding
   14. Torque

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the various types of ready-mix concretes

B. The student will be able to describe and identify the types of portland cements used in mixing concrete

C. The student will be able to identify ingredients in concrete and calculate their proportions

D. The student will be able to describe concrete slump and how to maintain a specific slump

E. The student will be able to measure ingredients for a concrete mix accurately

F. The student will be able to mix concrete by hand

G. The student will be able to mix concrete with a mortar mixer and by hand

H. The student will be able to mix concrete with a power concrete mixer

I. The student will be able to pass a concrete mixing written test with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | I. Admixtures<br><br>1. Types<br>2. Purposes<br>3. Use<br>4. Precautions | | | | |

## Task

I. Identify and describe different types of concrete forms

II. Identify and describe the parts of a wall form

III. Design a concrete form for specific strength considerations

IV. Oil a form

V. Construct a simple concrete form

## Theory

A. Form types
   1. Earth
   2. Metal
   3. Wood
   4. Fiber forms
   5. Plastic forms
   6. Other new materials

B. Parts of a wall form
   1. Sheathing
   2. Studs
   3. Braces
   4. Wales (walers)
   5. Shoe plates
   6. Spreaders
   7. Tie wires
   8. Stakes
   9. Strongback
   10. Lock pins

C. Design forms for strength
   1. Maximum concrete pressure, rate of placement
   2. Maximum allowable stud spacing
   3. Tie wire spacing
   4. Maximum allowable wale spacing
   5. Other considerations

D. Oiling and wetting forms
   1. Oil for wood forms
   2. Oil for steel forms
   3. Application of oil
   4. Other coating materials
   5. Wetting forms

E. Construction of a simple form
   1. Design for purpose
   2. Materials
   3. Procedures
   4. Inspection

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe different types of concrete forms

B. The student will be able to identify and describe the parts of a wall form

C. The student will be able to calculate the spacing of component parts of a form for design loads

D. The student will be able to wet down or oil a form

E. The student will be able to construct a simple concrete form

F. The student will be able to pass a written test on concrete formwork with 70% accuracy

## Task

I. Describe and identify concrete reinforcing principles

II. Identify and describe places where concrete reinforcing is used

III. Identify and describe typical shapes of reinforcing steel

IV. Identify and describe reinforcing bar grade markings

V. Describe basic considerations for use of reinforcing steel

VI. Describe placement of concrete reinforcing



## Theory

A. Reinforcement principles
   1. Reinforced concrete
   2. Tensile strength
   3. Shear strength
   4. Bond strength
   5. Bending strength
   6. Creep
   7. Specifications
   8. Design
   9. Workmanship

B. Types of use
   1. Beam reinforcement
   2. Column reinforcement
   3. Vertical reinforcement
   4. Footing reinforcement
   5. Fireplace hearth
   6. Pilaster reinforcement

C. Rebar shapes
   1. Straight bar
   2. Bent or truss bar
   3. Stirrup
   4. Chair
   5. Bolster (bar support)

D. Rebar markings
   1. Continuous line system-grade marks
   2. Number system marks
   3. Type steel
   4. Initial mill

E. Basic considerations for use
   1. Grades
   2. Hooks
   3. Bolsters and chairs
   4. Stirrups
   5. Splices
   6. Storing and cleaning
   7. Fabrication
   8. Plastic rebar

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the principle reasons for use of rebar in reinforcing concrete

B. The student will be able to describe where rebar is used in concrete structures

C. The student will be able to identify typical parts and shapes of steel reinforcing

D. The student will be able to identify and describe markings on steel rebar

E. The student will be able to describe the basic considerations for use of steel rebar

F. The student will be able to cut, bend, place and secure rebar for concrete reinforcing

G. The student will be able to pass a written test on concrete reinforcing with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | F. Placement of rebar<br><br>1. Handling rebar<br>2. Support<br>3. Spacers<br>4. Columns<br>5. Floor slabs<br>6. Beams<br>7. Walls and footings<br>8. Welded wire fabric<br>9. Tie rebar with wire<br>10. Welding rebar | | | | |

## Task

I. Design a footing

II. Location of footing and dimensions

III. Excavation of footing

IV. Placement of rebar

V. Placement of concrete

VI. Protection of footing

## Theory

A. Footing design
   1. Wall thickness and width
   2. Soil conditions
   3. Reinforcement
   4. Concrete specifications
   5. Dimensions

B. Footing location and size
   1. Blueprint dimensions
   2. Location from surveyor's building lines
   3. Location of walls, piers, fireplaces and other specialties
   4. Step footings

C. Excavation
   1. Earth forms
   2. Wood and step forms
   3. Depth and width of excavation
   4. Workmanship
   5. Virgin soil

D. Reinforcement
   1. Blueprint and specifications
   2. Location
   3. Chairs
   4. Overlaps
   5. Bends and hoods
   6. Considerations at piers
   7. Mats for piers, pilasters and fireplaces

E. Concrete placement
   1. Types and consistency
   2. Testing
   3. Placement
   4. Finished surface
   5. Keyways

F. Excavating safety
   1. Soil conditions
   2. Angle of repose
   3. Shoring and bracing
   4. Inspections
   5. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the designing of a concrete footing

B. The student will be able to locate building lines and corner and height stakes for a footing

C. The student will be able to excavate and form a concrete footing to specifications and blueprints

D. The student will be able to cut, bend, place and splice rebar for a concrete footing

E. The student will be able to place and finish concrete for a footing

F. The student will be able to protect a concrete footing for proper cure, strength and quality

G. The student will be able to pass a written test on concrete footings with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | G. Protection of footing<br><br>1. Cure<br>2. Placement of first course block<br>3. Preventing cracking | | | | |

## Task

I. Layout a sidewalk

II. Excavate a sidewalk

III. Place forms for sidewalk

IV. Place concrete for sidewalk

V. Finish concrete sidewalk

VI. Protect concrete sidewalk

## Theory

A. Layout
   1. From blueprints
   2. Stakes and lines

B. Excavation
   1. Depths and widths
   2. Virgin soil

C. Form placement
   1. Form types
   2. Form woods
   3. Oiling
   4. Cutting, alignment with lines
   5. Nailing, bracing and stakes
   6. Back up fill
   7. Pitch

D. Concrete placement
   1. Specified type
   2. Air-entrained cement
   3. Ready-mix versus by hand
   4. Use of concrete shute
   5. Spreading and screed
   6. Edges, expansion joints and control groove joints
   7. Workmanship

E. Finish concrete surface
   1. Types of finishes
   2. Tools used in finish
   3. Floating
   4. Broom finish
   5. Edge and joint finish

F. Protect sidewalk
   1. From initial damages
   2. For proper cure
   3. Removing forms
   4. Finish grade
   5. Clean and store form materials

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to layout a concrete sidewalk

B. The student will be able to excavate for a concrete sidewalk

C. The student will be able to form a concrete sidewalk

D. The student will be able to place concrete for a sidewalk

E. The student will be able to place expansion joints for a concrete sidewalk

F. The student will be able to finish a concrete sidewalk

G. The student will be able to protect a concrete sidewalk for proper cure

H. The student will be able to pass a written test on concrete sidewalk construction with 70% accuracy

## Task

I. Identify the ingredients used to make mortar

II. Identify the different types of mortar and the proportions of ingredients used to make them

III. Identify the different types of prepared masonry cements and their types

IV. Mix mortar by hand

V. Mix mortar for different projects

## Theory

A. Mortar ingredients
   1. Sand
   2. Water
   3. Portland cement
   4. Lime
   5. Prepared masonry cements

B. Mortar types
   1. MSNOK ("MASON WORK")
   2. Compare compressive strengths
   3. Use of different types of mortar
   4. Lime and its importance

C. Masonry cements
   1. Prepared ratios
   2. Types available
   3. Ratios of masonry cements to make mortar

D. Mix mortar by hand
   1. Ingredients
   2. Proportions of ingredients for a mix
   3. Sandwich arrangement of materials
   4. Dry mixing
   5. Addition of water
   6. Completing the mix
   7. Desired consistency
   8. Consistent mixing

E. Mixing for different projects
   1. 12" block mud
   2. 8" block mud
   3. Plaster mix
   4. Stone mix
   5. Brick mud

F. Specialized mortars
   1. Colored mortar
   2. ELMAX - extended life mortar admixture

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe the ingredients used to make mortar

B. The student will be able to identify the different types of mortar and describe their uses and proportions of portland cement to lime ratios

C. The student will be able to identify and describe the different types of prepared masonry cements available and their uses

D. The student will be able to mix mortar by hand

E. The student will be able to mix different consistencies of mortar for different job requirements

F. The student will be able to pass a written test on mixing mortar by hand with 70% accuracy

## Task

I. Identify and describe hand tools used to lay block to a line

II. Line set up

III. Spreading mortar

IV. Block placement - first course

V. Block placement - other than first course

VI. Maintaining bond

VII. Jointing and finishing

## Theory

A. Hand tools and use
   1. Line blocks
   2. Line stretchers
   3. Line pins
   4. Twigs or triggers
   5. Mason line
   6. Trowel
   7. Torpedo level
   8. Jointers
   9. 4' plumb rule
   10. Mason's hammer

B. Line set up
   1. Which type of attaching device to use
   2. Line tension and safety
   3. Line location

C. Spread mortar
   1. Trowel full
   2. Handling and placement for bed joint
   3. Applying mud to ears

D. First course of block
   1. To line
   2. Torpedo level

E. Second and successive courses of block
   1. To line
   2. Lipping and rolling

F. Maintain bond
   1. Basic layout
   2. Maintaining layout

G. Jointing and finishing
   1. Types of jointers
   2. Types of joints
   3. Making joints
   4. Finishing wall

H. Pattern bonds
   1. Half bond
   2. Stack bond

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
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   4. Bonding of molecules
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   2. Heat and energy
   3. Strength
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   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and use all hand tools for laying block to a line

B. The student will be able to set up and maintain a line for construction of a block wall

C. The student will be able to spread mortar for a block wall and mud the ears of a block

D. The student will be able to place and align block in a wall using a line

E. The student will be able to maintain an established bond in a wall

F. The student will be able to joint a block wall to desired specifications and finish the wall

G. The student will be able to pass a written test on laying block to a line with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | I. Reinforcing<br><br>1. Truss wire<br>2. Placement<br>3. Overlap<br>4. Blueprint specifications | | | | |

## Task

I. Identify common block types

II. Layout corner

III. Place and level block

IV. Plumb corner and tails

V. Range both sides of corner

VI. Maintain height of each course

VII. Work neatly

III. Making production

IX. Jointing and finish

X. Evaluate a block corner's construction

## Theory

A. Types of block corners
   1. 8", 12' and 4"
   2. Split ribbed
   3. Others

B. Layout of a corner
   1. Square
   2. Block spacing
   3. Relation to other corners

C. Place and level blocks
   1. Use of mortar bed
   2. Place by eye
   3. Level by lowering high spots
   4. Level from corner

D. Plumb
   1. Four points of plumb
   2. Lipping
   3. Rolling block
   4. Accuracy

E. Range
   1. Bottom of block
   2. Top of block

F. Maintaining heights
   1. Desired height
   2. Altering heights

G. Neatness
   1. During construction
   2. Completion of corner

H. Production
   1. Techniques
   2. Psyche

I. Joint and finish
   1. Types and methods
   2. Protecting

J. Reinforcing
   1. Truss wire
   2. Cutting wire
   3. Bending wire
   4. Placement
   5. Blueprint specifications

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
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   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify different types of corners and leads

B. The student will be able to layout a block corner

C. The student will be able to place and level block in a corner

D. The student will be able to plumb a corner

E. The student will be able to range a corner

F. The student will be able to maintain or alter a given height on a corner

G. The student will be able to construct a corner neatly

H. The student will be able to construct a corner in a productive manner

I. The student will be able to joint and finish a corner

J. The student will be able to evaluate a corner's construction

K. The student will be able to pass a written test on corner construction with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | K. Evaluating<br><br>1. Grade sheet<br>2. Critical approach | | | | |

## Task

I. Identify and describe different types of pre-fab frames used in masonry construction

II. Install a steel door frame in a masonry wall

III. Install a window in a basement wall

IV. Install a vent in a crawlspace foundation

## Theory

A. Types of pre-fab frames
   1. Steel door frame
   2. Bilco door
   3. Window frame
   4. Vent
   5. Crawlspace access doorway
   6. Other considerations

B. Steel door installation
   1. Door from blueprints schedule
   2. Type of door, including size and swing
   3. Assembly
   4. Handling
   5. Set up
   6. Alignment
   7. Bracing
   8. Ties for wall
   9. Construction to
   10. Spacers
   11. Filling door buck
   12. Placing lintels to
   13. Finishing
   14. Other considerations

C. Window installations in a foundation wall
   1. Window from blueprint schedule
   2. Type of window, size and opening
   3. Use of sash block
   4. Prepare for window sill
   5. Placement
   6. Finish

D. Vent installation
   1. Selection and location
   2. Placement and finish

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe the use of pre-fab frames in masonry construction

B. The student will be able to install a steel door frame in a masonry wall

C. The student will be able to install a window in a basement wall

D. The student will be able to install a vent in a crawl space foundation

E. The student will be able to pass a written test on pre-fab frames and their installation with 70% accuracy

## Task

I. Apply a scratch coat of plaster to a wall

II. Apply a finish coat of plaster to a wall

III. Apply a textured coat of stucco to a plastered wall

IV. Fasten wire lath to a wall

## Theory

A. Wall preparation
   1. Block wall
      a. structural soundness
      b. clean
      c. moisture content
      d. bonding agents
   2. Wood wall
      a. structural soundness
      b. apply vapor barrier
      c. cutting wire lath
      d. positioning wire lath on wall
      e. fastening, nail, wire lath to wall
      f. proper overlap
      g. corner guides
      h. stops
      i. expansion jionts
      j. keeping wire lath flat
      k. handling wire lath in a safe manner

B. Plaster mix
   1. Mix ingredients
      a. prepared mix
      b. job site mixing
      c. proportion
   2. Mix consistency
      a. below and above grade
      b. water content
   3. Mixing plaster
      a. preparation
      b. mixing
      c. retempering
      d. mix time
      e. use of admixtures
      f. coloring
      g. stucco mixing

C. Apply scratch coat
   1. Wall preparation
   2. Material set up
   3. Equipment and tools
   4. Actual application
      a. techniques
      b. thickness
      c. maintaining flat surface
      d. scratching
   5. Protection for cure

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to fasten wire lath to a wood wall in preparation for plastering

B. The student will be able to apply a scratch coat of plaster to a wall

C. The student will be able to apply a finish coat of plaster to a wall and finish the surface in a specific texture

D. The student will be able to apply a coat of stucco to a wall in a textured manner

E. The student will be able to cut wire lath to specifications

F. The student will be able to prepare a cement mix suitable for use in plastering

G. The student will be able to mix stucco

H. The student will be able to pass a written test with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | D. Apply a finished coat<br>1. Wall preparation<br>2. Material set up<br>3. Equipment and tools<br>4. Actual application<br>a. techniques<br>b. thickness<br>c. maintaining flat surface<br>d. achieving desired textured finish<br>5. Protection for cure<br><br>E. Application of stucco<br>1. Wall preparation<br>2. Material set up<br>3. Equipment and tools<br>4. Mixing stucco<br>5. Actual application<br>a. techniques<br>b. thickness<br>c. maintaining flat surface<br>d. creating desired textures<br>6. Protection for cure | | | | |

## Task

I. Identify and describe different block bonds

II. Calculate the best bond for a block foundation

III. Construct corners in relatinoship to best bond pattern

IV. Maintain an established bond in a wall

V. Construct a running bond wall

VI. Construct a stacked bond wall

## Theory

A. Block bond types
   1. Running bond
   2. Stacked bond
   3. 3/4 bond

B. Calculate the best bond for a foundation wall
   1. Blueprint review
   2. Avoiding of pieces in a wall
   3. Bonding corners for avoiding pieces in wall
   4. Where pieces can not be avoided, proper placement
   5. Simple block foundation
   6. Complicated foundation for brick face
   7. Actual calculations and checking

C. Construct corners for bond
   1. Basic layout and check
   2. Inside versus outside corner as with 12" block ledge with step bact to 8"
   3. Placement of pieces in a corner

D. Maintaining a bond
   1. First course layout
   2. Plumbing up head joints
   3. Maintaining piece in a wall

E. Construct running bond
   1. Layout best bond
   2. Construct and maintain bond

F. Stack bond - layout and maintain

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe different block bonds and their use

B. The student will be able to calculate the best bond for a foundation wall

C. The student will be able to construct corners in relationship to each other in order to establish the best bond

D. The student will be able to construct a block wall and maintain an established bond from the first course

E. The student will be able to construct a wall with a running bond pattern

F. The student will be able to construct a wall with a stacked bond pattern

G. The student will be able to pass a written test on bonding a block wall with 70% accuracy

**UNIT:** BRICK

**TOPIC:** LAY BRICK TO A LINE

## Task

I. Identify and describe the hand tools used to lay brick to a line

II. Line set up

III. Spreading mortar

IV. Brick placement to line

V. Alignment of brick

VI. Maintaining bond

VII. Bond types

VIII. Jointing and finish

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## Theory

A. Hand tools and use
   1. Line blocks
   2. Line pins and twigs
   3. Mason line
   4. Trowel
   5. Levels
   6. Hammer and others

B. Line set up
   1. Established corners
   2. Corner poles
   3. Line tension
   4. Line location

C. Spread mortar
   1. Trowel full
   2. Handling and placement for bed joint

D. Brick placement
   1. Handling brick
   2. Mudding end of brick
   3. Placement to line

E. Alignment of brick
   1. Where to look
   2. Line
   3. Lower course

F. Maintaining a bond
   1. Type of bond
   2. First course layout
   3. Plumb the head joints

G. Bond types
   1. Common - running
   2. Stacked
   3. Flemish
   4. Others

H. Joint and finish
   1. Types of jointers
   2. Types of joints
   3. Making joints
   4. Finishing wall

I. Wall ties
   1. Placement
   2. Use

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and use all hand tools for laying brick to a line

B. The student will be able to set up and maintain a line for construction of a brick wall

C. The student will be able to spread mortar for a brick wall and mud the end of a brick

D. The student will be able to place brick to a line and align properly while maintaining an established bond

E. The student will be able to construct a brick wall using different bonding types

F. The student will be able to make different types of joints on a brick wall and finish the wall

G. The student will be able to pass a written test on laying brick to a line with 70% accuracy

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## Task

I. Identify common brick

II. Layout a brick corner

III. Place and level brick

IV. Plumb corner and tails

V. Range both sides of a corner

VI. Maintain height of each corner

VII. Work neatly

VIII. Make production

IX. Jointing and finish

X. Evaluate a brick corner's construction

## Theory

A. Types of common brick
   1. Solid, cored
   2. Used versus new
   3. Sizes and finishes

B. Layout a corner
   1. Square
   2. Brick spacing
   3. Relation to other corners

C. Place and level bricks
   1. Use of mortar bed
   2. Placement by eye
   3. Level high spots
   4. Level from corner

D. Plumb brick corner
   1. Four points of plumb
   2. Lipping and rolling
   3. Accuracy

E. Range sides
   1. Reference to plumb points
   2. Making adjustments

F. Maintaining heights
   1. Brick and modular spacing rules
   2. Desired heights
   3. Altering heights

G. Neatness
   1. During construction
   2. Completion of corner

H. Production
   1. Techniques
   2. Psyche

I. Joint and finish
   1. Types and methods
   2. Protecting

J. Evaluating construction
   1. Grade sheet
   2. Critical approach

K. Wall ties
   1. Placement
   2. Use

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify different types of corners and brick

B. The student will be able to layout a brick corner

C. The student will be able to place and level brick

D. The student will be able to plumb a brick corner

E. The student will be able to range a brick corner

F. The student will be able to maintain or alter a given height on a corner

G. The student will be able to construct a corner neatly

H. The student will be able to construct a corner in a productive manner

I. The student will be able to joint and finish a corner

J. The student will be able to evaluate a corner's construction

K. The student will be able to pass a written test on corner construction with 70% accuracy

## Task

I. Identify and describe equipment used for corner poles

II. Differentiate between an outside and an inside corner

III. Set up and align corner poles

IV. String lines on a corner pole

V. Mark brick heights on a corner pole

VI. Use corner poles to construct brick wall

## Theory

A. Corner pole types
   1. Frame lumber
   2. Professional metal

B. Corner pole parts
   1. Corner pole
   2. Mounting brackets
   3. Line attaching devices
   4. Mason line

C. Corner types
   1. Outside and corner pole use
   2. Inside and corner pole use or other line attaching methods
   3. Other than right corners

D. Corner pole set up and alignment
   1. Straight edges
   2. Mounting bracket set up or use of frame lumber spacers
   3. Attachment of corner poles to building
   4. Alignment of corner poles for plumb and proper spacing from existing wall
   5. Checking alignment
   6. Maintaining poles

E. String mason line
   1. Corner block use
   2. Inside intermediate line attaching device
   3. Tension lines
   4. Alignment of line with brick height marks

F. Mark brick heights
   1. Determining heights that must be made
   2. Brick spacing calculations
   3. Transferring line heights from building to corner poles

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe the equipment used in working with corner poles

B. The student will be able to differentiate between outside and inside corners

C. The student will be able to set up and align corner poles

D. The student will be able to string lines on corner poles and set these lines to desired heights

E. The student will be able to calculate brick heights for a veneer wall and mark these heights on corner poles

F. The student will be able to construct a brick veneer wall with the aid of corner poles

G. The student will be able to pass a written test on corner poles with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| | 4. Checking number of courses<br>5. Following heights marked on corner poles during construction<br><br>G. Corner pole use<br><br>1. Selection of corner poles<br>2. Placement of corner poles<br>3. Marking and setting lines on a corner pole<br>4. Laying to a line with the aid of a corner pole<br>5. Other considerations | | | | |

## Task

I. Describe the use of flashing with brickwork

II. Cut and place flashing below sill plate for weep holes

III. Cut and place flashing for rowlock course under a window and over doors and windows

IV. Cut and place flashing for a fireplace chimney

## Theory

A. Flashing use
   1. Weep hole course
   2. Under window rowlocks
   3. Over window and door angle irons
   4. Chimney and fireplace chimney flashing

B. Cut and place flashing for weep hole course
   1. Determining weep hole course
   2. Type of flashing
   3. Cutting and handling
   4. Nailing to wall
   5. Placement for finish
   6. Laying brick on flashing

C. Cut and place flashing for a window rowlock
   1. Flashing types
   2. Cutting and handling
   3. Placement and nailing
   4. Laying brick rowlock

D. Cut and place flashing for over doors and windows
   1. Flashing types
   2. Cutting and handling
   3. Placement and nailing
   4. Laying brick over

E. Cut and place flashing for a fireplace chimney
   1. Flashing types
   2. Cutting and handling
   3. Placement of step flashing
   4. Counter flashing placement
   5. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe different types of flashings and their use

B. The student will be able to cut and bend different types of flashings

C. The student will be able to handle and place flashings in a safe way

D. The student will be able to cut and place flashing for a weep hole course

E. The student will be able to cut and place flashing for a window rowlock course

F. The student will be able to cut and place flashing for over windows and doors

G. The student will be able to cut and place flashing for a chimney

H. The student will be able to pass a written test on flashing with 70% accuracy

## Task

I. Layout a brick rowlock course

II. Place leads for a brick rowlock

III. Attach lines for brick placement in a rowlock

IV. Place bricks in a rowlock course

V. Finish a brick rowlock

## Theory

A. Introduction to rowlocks
   1. Steps
   2. Window sills
   3. As a brick position

B. Place rowlock layout
   1. Brick spacing
   2. Pitch
   3. Cut or full brick
   4. Marking layout

C. Place leads for rowlock
   1. Layout
   2. Mortar placement
   3. Brick placement
   4. Brick alignment
   5. Alignment of leads in relationship to each other
   6. Level and pitch
   7. Range and height
   8. Step layout

D. Line attachment for rowlock
   1. Line blocks
   2. Line
   3. Twigs
   4. Tension
   5. Marking layout on line

E. Brick placement for rowlock
   1. Following line
   2. Following line marks
   3. Maintaining level and pitch
   4. Plumb

F. Finish a rowlock
   1. Jointing top
   2. Jointing face rowlock end
   3. Brush and protect
   4. Silicone seal

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe a rowlock and its use in brickwork

B. The student will be able to layout a brick rowlock

C. The student will be able to place leads for a rowlock

D. The student will be able to attach lines for construction of a rowlock

E. The student will be able to place brick in a rowlock

F. The student will be able to construct a simple step

G. The student will be able to construct a window sill rowlock

H. The student will be able to finish and protect a rowlock

I. The student will be able to silicone seal a brick rowlock

J. The student will be able to pass a written test on rowlock construction with 70% accuracy

## Task

I. Identify and describe different types of arches

II. Identify the parts of an arch

III. Describe the forces acting on an arch

IV. Describe and construct an arch template

V. Set up an arch template

VI. Lay brick to an arch template

VII. Remove a brick arch template and finish arch



## Theory

A. Arch types
   1. Roman semi circle
   2. Gothic
   3. Jack
   4. Others

B. Parts of an arch
   1. Abutments
   2. Intrados and extrados
   3. Arch axis
   4. Crown and keystone
   5. Rise and run
   6. Span
   7. Major and minor
   8. Voussoirs
   9. Other parts

C. Forces on an arch
   1. Gravity
   2. Vector forces
   3. Distribution of force

D. Template construction
   1. Layout
   2. Span and rise
   3. Arch types
   4. Marking and cutting
   5. Assembly of parts

E. Template set up
   1. Positioning
   2. Plumb and level
   3. Supporting
   4. Layout of brick

F. Lay brick to an arch
   1. Mortar placement
   2. Brick placement

G. Remove template and finish
   1. Template removal
   2. Finishing face and intrados surface
   3. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe different types of arches

B. The student will be able to identify and describe the parts of an arch

C. The student will be able to identify the force acting on an arch and how this force acts on the arch

D. The student will be able to construct a template for a brick arch

E. The student will be able to set up and layout brick on an arch template

F. The student will be able to lay brick in an arch

G. The student will be able to remove a template from an arch and finish the arch brick

H. The student will be able to pass a written test on brick arch construction with 70% accuracy

## Task

I. Describe methods for keeping a wall clean during construction

II. Describe different types of brick and methods of cleaning

III. Use of acid in cleaning a brick wall

IV. Safe use of solutions for cleaning a brick wall



## Theory

A. Keeping a wall clean
   1. Handling and storage of brick
   2. Placement of brick in a wall
   3. Cutting off mortar
   4. Avoid splashing a wall
   5. Scaffold plank distance
   6. Protection when placing concrete near

B. Brick types and cleaning methods
   1. Solid color brick
   2. Painted brick i.e., new used brick
   3. Use of detergents on brick
   4. Use of acid on brick

C. Use of acid and detergents on brick
   1. Preparation
   2. Acid or detergent use
   3. Mixing acids with water
   4. Wetting wall
   5. Application of chemicals to wall
   6. Cleaning with brush
   7. Rinse wall

D. Safe use of solutions for cleaning brick
   1. Proper protective wear
   2. Handling acids
   3. Mixing acids
   4. Cautions in application
   5. Protecting environment
   6. Clean up and storage of acids
   7. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

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D. Percentages

E. Weights and measurements

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G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe methods for maintaining a clean brick wall during construction

B. The student will be able to describe the use of different cleaning techniques for different brick

C. The student will be able to use acids and detergents to clean a brick wall

D. The student will be able to pass a written safety test on cleaning brick walls with 100% accuracy

E. The student will be able to pass a written test on cleaning a brick wall with 70% accuracy

## Task

I. Layout the bond for a brick wall

II. Identify six brick positions

III. Layout height marks for brick wall

IV. Use a brick spacing and modular rule

V. Brick step layout

## Theory

A. Layout brick bond
   1. First course layout
   2. Second course layout
   3. Dry bonding
   4. Bond for full brick
   5. At windows, doors and other openings
   6. Starting corner brick
   7. Adjusting the bond
   8. Maintaining the bond

B. Six brick positions and their use
   1. Stretcher
   2. Shiner
   3. Soldier
   4. Sailor
   5. Rowlock
   6. Header

C. Layout of height marks
   1. Calculating heights
   2. Use of brick space rule
   3. Use of modular rule
   4. Type of brick
   5. Openings and specific heights
   6. Multiple heights
   7. Marking heights at corners
   8. Maintaining heights
   9. Adjusting heights
   10. Other considerations

D. Step layout
   1. Rise versus run
   2. Tred length
   3. Riser height
   4. Rowlock spacing
   5. Sides of step and risers
   6. Maintain equal steps

## Communication Skills

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   1. Textbook
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C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to drybond brick for a wall

B. The student will be able to identify the six basic brick positions and describe their use

C. The student will be able to measure, calculate and mark brick heights for a wall

D. The student will be able to use a brick space and modular rule

E. The student will be able to layout a brick step

F. The student will be able to pass a written test on brick layout with 70% accuracy

**UNIT:** FIREPLACE CONSTRUCTION

**TOPIC:** BUILD A FIREBOX

## Task

I. Firebox design and theory

II. Firebox layout

III. Construct a firebox

## Theory

A. Firebox design and theory
   1. Fireplace history
   2. Fireplace draft
   3. Fireplace firebox energy radiation
   4. Fireplace types and firebox designs
   5. Fireplace sizes and firebox designs
   6. Firebox firebrick
   7. Mortar types and use
   8. Other considerations

B. Firebox layout
   1. Firebox size
   2. Firebox measurements
   3. Firebox floor bond
   4. Location of cleanout
   5. Angled side walls
   6. Straight back wall
   7. Inclined back wall
   8. Angled brick sidewalls
   9. Relation to and placement of damper

C. Firebox construction
   1. Review layouts
   2. Review types and sizes
   3. Mix type
   4. Brick placement
   5. Brick alignment
   6. Jointing
   7. Plastering outside of firebox
   8. Use of wall ties for fireplace face
   9. Quality
   10. Proper size and shape
   11. Neatness
   12. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the designs and theory for firebox construction

B. The student will be able to layout a firebox

C. The student will be able to construct a firebox

D. The student will be able to pass a written test on firebox construction with 70% accuracy

## Task

I. Describe the design and theory behind smoke chamber construction

II. Identify the parts and describe their importance

III. Construct a fireplace smoke chamber

## Theory

A. Design and theory behind the smoke chamber
   1. Draft
   2. Fireplace construction history and design
   3. Function and shape
   4. Size

B. Smoke chamber parts
   1. Throat
   2. Smoke shelf
   3. Damper
   4. Damper door and controls
   5. Angled sides
   6. Straight back

C. Smoke chamber construction
   1. Damper placement
   2. Angle iron placement
   3. Use of expansion joint fiberglass insulation
   4. Layout of brick
   5. Mortar type
   6. Corbel brick
   7. Angle sides and straight back
   8. Maintaining angles
   9. Height and top dimensions from flue liner
   10. Smoke shelf construction
   11. Protection of smoke shelf and damper
   12. Plaster inside and outside of chamber smooth
   13. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the design, history and theory behind the smoke chamber construction

B. The student will be able to layout a smoke chamber

C. The student will be able to construct a smoke chamber to specifications

D. The student will be able to pass a written test on smoke chamber construction with 70% accuracy

## Task

I. Describe the theory behind draft and chimney construction

II. Construct a simple single flue chimney for a wood stove

III. Construct a fireplace chimney

IV. Identify, describe and practice safe construction techniques for chimney and fireplace construction

## Theory

A. Draft theory
   1. Gases
   2. Heat
   3. Temperature differences
   4. Draft
   5. Flue size
   6. Chimney height
   7. Chimney height above roof and other restrictions
   8. Other considerations

B. Single flue chimney
   1. Materials
   2. Flue size
   3. Layout
   4. Thimble placement
   5. Cleanout door
   6. Flue liner placement
   7. Block and/or brick construction
   8. "Bending" flues
   9. Chimney clearance and height
   10. Cap
   11. Spark arrestor and hood
   12. Other considerations

C. Fireplace chimney
   1. Similarities to simple single flue chimney
   2. Dissimilarities to simple single flue chimney
   3. Flue size and placement
   4. Multiple flues in fireplace chimney
   5. Other considerations

D. Safety, chimney and fireplace construction and use
   1. How fires start
   2. Installations of wood stoves, fireplaces, heatilators and chimneys
   3. Operation and maintenance
   4. Clearances
   5. Safe chimneys
   6. Safety codes, and standards
   7. Safety related products
   8. Other considerations

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

## Science Knowledge

A. Chemistry
   1. Chemical reactions
   2. Reaction times
   3. Catalyst
   4. Bonding of molecules
   5. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to describe the theory and design of a chimney relating to draft

B. The student will be able to construct a simple, single flue chimney

C. The student will be able to construct a fireplace chimney

D. The student will be able to describe the safe construction of a chimney and fireplace

E. The student will be able to describe the safe operation and use of a chimney and fireplace

F. The student will be able to pass a written test on chimney construction and wood burning safety with 70% accuracy

| Task | Theory | Communication Skills | Mathematics Skills | Science Knowledge | Student Outcome |
|---|---|---|---|---|---|
| I. Describe and identify wood used in carpentry construction<br><br>II. Identify and describe the seasoning of lumber<br><br>III. Use fasteners | A. Lumber types<br>1. Softwood<br>2. Hardwood<br>3. Plywood<br>4. Specialty products<br>B. Softwood<br>C. Cutting woods<br>D. Moisture content<br>E. Lumber seasoning<br>F. Defects common in lumber<br>G. Lumber grades<br>H. Plywoods and their manufacture<br>I. Treated lumber<br>J. Specialty lumber products<br>K. Related materials<br>L. Nails<br>M. Screws<br>N. Adhesives and use<br>O. Metal connectors used in framing<br>P. New products<br>Q. Other considerations | A. Functional reading skills<br>1. Textbook<br>2. Handouts<br>B. Outlining and note taking<br>1. Textbook<br>2. Overhead transparencies<br>C. Vocabulary<br>D. Spelling<br>E. Inferences<br>F. Following directions<br>G. Interpretation of diagrams<br>H. Interpretation of graphs, charts and drawings<br>I. Test taking skills<br>J. Problem solving<br>K. Oral communications<br>L. Study skills | A. Whole numbers<br>B. Common fractions<br>C. Decimals<br>D. Percentages<br>E. Weights and measurements<br>F. Ratio and proportion<br>G. Powers and roots<br>H. Formulas<br>I. Estimating<br>J. Geometry<br>K. Graphs | A. Chemistry<br>1. Chemical reactions<br>2. Reaction times<br>3. Catalyst<br>4. Bonding of molecules<br>5. Atomic structure<br>B. Physics<br>1. Absorption<br>2. Heat and energy<br>3. Strength<br>4. Work<br>5. Forces<br>6. Color<br>7. Optics<br>8. Molecular structure<br>9. Weight<br>10. Vector forces<br>11. Motion<br>12. Leverage<br>13. Bonding<br>C. Biology<br>1. Human anatomy and work movements<br>2. Physiology and work with chemicals<br>3. Protecting self and other life forms<br>D. Earth science<br>1. Natural resources<br>2. Protecting the environment | A. The student will be able to identify and describe different woods used in carpentry construction<br><br>B. The student will be able to describe wood sources and wood production techniques that provide industry demands<br><br>C. The student will be able to identify and describe the use of various fasteners used in the carpentry trades<br><br>D. The student will be able to identify and describe new products in the carpentry trades<br><br>E. The student will be able to pass a written test on carpentry materials with 70% accuracy |

## Task

I. Install a wood sill plate

II. Place floor joists

III. Place floor bridging

IV. Place sub floor

## Theory

A. Install wood sill plate
   1. Wolmanized, pressure treated wood
   2. Sill flashing, sealer
   3. Marking and drilling holes for anchor bolts
   4. Placement of sill
   5. Anchor sill plate to foundation with anchor bolts

B. Place floor joists
   1. Marking floor joists on sill plate
   2. Cutting joists
   3. Fasten floor joists to header joists
   4. Floor joist size and spacing from blueprints
   5. Openings and floor framing
   6. Joists on beams and overlap
   7. New floor joist materials

C. Place floor bridging
   1. Types
   2. Spacing
   3. Placement and nailing

D. Place sub floor
   1. Plywood
   2. Glued system
   3. Spacing and overlap
   4. Nailing

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
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C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to install a wood sill plate to a foundation

B. The student will be able to place and nail floor joists and header joists

C. The student will be able to frame floor openings

D. The student will be able to place and nail floor bridging

E. The student will be able to cut, place and nail sub flooring

F. The student will be able to pass a written test on floor construction with 70% accuracy

## Task

I. Identify and describe the parts of a wood framed wall

II. Pre-cut component parts for a wood framed wall

III. Fasten pre-cut and full wood parts for a wall

IV. Place a wood frame wall

V. Apply sheathing to a wood framed wall

## Theory

A. Parts of a wood framed wall
   1. Corners
   2. Sole plate
   3. Double top plates
   4. Studs
   5. Partition intersections
   6. Headers
   7. Cripple studs
   8. Rough openings
   9. Trimmer studs
   10. Spacer blocks
   11. Rough sill

B. Pre-cut component parts
   1. Wall layout from prints
   2. Full stud placement
   3. Making pre-cuts from blueprints
   4. Pre-cut identification and placement

C. Fasten wall parts
   1. Plate layouts
   2. Story poles use for rough sill and header placement
   3. Nailing studs
   4. Nailing trimmers, sill, cripple studs and headers
   5. Nailing plates
   6. Corner construction

D. Place wall frame
   1. Lifting techniques
   2. Anchor overlap at corners and intersecting walls
   3. Bracing wall
   4. Alignment for plumb

E. Sheathing
   1. Cutting
   2. Placement
   3. Nailing

## Communication Skills

A. Functional reading skills
   1. Textbook
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   1. Textbook
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C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

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I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

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K. Graphs

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## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe the parts of a wood frame wall

B. The student will be able to pre-cut component parts for a wood frame wall from blueprints

C. The student will be able to layout and fasten all component parts of a wood framed wall

D. The student will be able to place, anchor, brace and align a wood framed wall for plumb and proper alignment to other walls

E. The student will be able to pass a written test on carpentry wall framing with 70% accuracy

## Task

I. Identify and describe the parts of a ceiling frame

II. Cut component parts for a ceiling frame

III. Layout and fasten ceiling parts

## Theory

A. Parts of a ceiling frame

1. Ceiling joists
2. Ceiling headers
3. Rough openings and their framing
4. Hap cuts
5. Strong backs
6. Other considerations

B. Cut component parts of ceiling frame

1. Measurements and wood sizes from blueprints
2. Cutting wood parts to specifications

C. Layout and fasten ceiling parts

1. Layout parts from blueprint
2. Spacing
3. Nailing and fastening techniques
4. Nailing strongback

## Communication Skills

A. Functional reading skills

1. Textbook
2. Handouts

B. Outlining and note taking

1. Textbook
2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry

1. Bonding of molecules
2. Atomic structure

B. Physics

1. Absorption
2. Heat and energy
3. Strength
4. Work
5. Forces
6. Color
7. Optics
8. Molecular structure
9. Weight
10. Vector forces
11. Motion
12. Leverage
13. Bonding

C. Biology

1. Human anatomy and work movements
2. Physiology and work with chemicals
3. Protecting self and other life forms

D. Earth science

1. Natural resources
2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe the parts of a wood framed ceiling

B. The student will be able to cut parts for a wood ceiling from a blueprint

C. The student will be able to layout and fasten all component parts of a ceiling frame

D. The student will be able to pass a written test on ceiling framing with 70% accuracy

## Task

I. Identify and describe different types of roofs

II. Identify and describe the parts of a roof frame

III. Layout a roof rafter and cut

IV. Construct a roof section

## Theory

A. Roof types
   1. Gable
   2. Hip
   3. Shed
   4. Gambrel
   5. Mansard
   6. Flat

B. Parts of a roof
   1. Trusses
   2. Rafters
   3. Ridge board
   4. Bracing
   5. Sheathing
   6. Other considerations

C. Roof rafter layout
   1. Slope and pitch
   2. Span from prints
   3. Rise from prints
   4. Calculating measurements from prints
   5. Unit measure
   6. Cutting plumb cut, tail cut, seat cut and birds mouth from rafter layout
   7. Use of framing square
   8. Common rafters
   9. Hip and valley rafters
   10. Jack rafters
   11. Collar beams
   12. Porlins

D. Construction of roof
   1. Layout
   2. Cuts
   3. Nailing and bracing
   4. Application of roof sheathing

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

A. Whole numbers

B. Common fractions

C. Decimals

D. Percentages

E. Weights and measurements

F. Ratio and proportion

G. Powers and roots

H. Formulas

I. Estimating

J. Geometry

K. Graphs

L. Basic trigonometric functions

## Science Knowledge

A. Chemistry
   1. Bonding of molecules
   2. Atomic structure

B. Physics
   1. Absorption
   2. Heat and energy
   3. Strength
   4. Work
   5. Forces
   6. Color
   7. Optics
   8. Molecular structure
   9. Weight
   10. Vector forces
   11. Motion
   12. Leverage
   13. Bonding

C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to identify and describe different roof types

B. The student will be able to identify and describe component parts of a roof

C. The student will be able to layout and cut a common rafter

D. The student will be able to construct a roof section and sheath it

E. The student will be able to pass a written test on roof frame construction with 70% accuracy

## Task

I. Identify and describe roofing terms

II. Identify and describe roofing materials

III. Identify and describe the use of flashing

IV. Apply a simple roofing material

## Theory

A. Roofing terms
   1. Square
   2. Coverage
   3. Exposure
   4. Head lap
   5. Side lap
   6. Shingle butt

B. Roofing materials
   1. Asphalt
   2. Wood
   3. Mineral fiber
   4. Slate
   5. Tiles
   6. Others

C. Flashing use
   1. Eaves
   2. Open valley
   3. Woven
   4. Closed
   5. Chimney step and counter flashing
   6. Chimney cricket or saddle
   7. Pipes

D. Application of roofing
   1. Starter strip
   2. Strip shingles and their layout, placement and overlap
   3. Fasteners
   4. Maintaining layout
   5. Ridge finish

## Communication Skills

A. Functional reading skills
   1. Textbook
   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

F. Following directions

G. Interpretation of diagrams

H. Interpretation of graphs, charts and drawings

I. Test taking skills

J. Problem solving

K. Oral communications

L. Study skills

## Mathematics Skills

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## Science Knowledge

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   1. Chemical reactions
   2. Reaction times
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C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
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## Student Outcome

A. The student will be able to identify and describe basic roof terminology

B. The student will be able to identify and describe common roofing materials

C. The student will be able to describe the flashing of a roof

D. The student will be able to apply roofing material to a roof

E. The student will be able to pass a written test on application of roofing materials with 70% accuracy

UNIT: ESTIMATING

TOPIC:

## Task

I. Estimate material needs for a specific job

II. Estimate the time necessary to complete a specific job

III. Estimate the labor need for a specific job

IV. Estimate the profit/ overhead for a specific job

## Theory

A. Introduction
   1. Reference materials
   2. Tables for estimating
   3. Formulas for estimating
   4. Experience in calculations

B. Estimating materials
   1. Blueprints
   2. Specifications
   3. Square foot versus unit
   4. Breakdown of project
   5. Itemizing portions
   6. Totals
   7. Checking figures
   8. Percentage unusable
   9. Maintaining records from previous jobs

C. Estimating time
   1. Standard crews
   2. Standard times
   3. Adjusting standard times for crews
   4. Maintaining records from previous jobs
   5. Calculations
   6. Chance for errors

D. Estimating labor
   1. Standard crews
   2. Limitations of equipment
   3. Time requirements
   4. Maintaining records

E. Estimate profit/overhead
   1. Material, labor and equipment
   2. Taxes, insurance and professional services
   3. Other considerations
   4. Profit percentage

## Communication Skills

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   2. Handouts

B. Outlining and note taking
   1. Textbook
   2. Overhead transparencies

C. Vocabulary

D. Spelling

E. Inferences

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## Science Knowledge

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C. Biology
   1. Human anatomy and work movements
   2. Physiology and work with chemicals
   3. Protecting self and other life forms

D. Earth science
   1. Natural resources
   2. Protecting the environment

## Student Outcome

A. The student will be able to estimate material needs from a blueprint and specifications

B. The student will be able to estimate the time it will take to complete a specific project

C. The student will be able to estimate the labor requirements for specific jobs

D. The student will be able to estimate a reasonable profit margin in terms of percentage of the overhead and expenses

E. The student will be able to pass a written test on estimating with 70% accuracy